

# MARINE REVIEW.

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## Pay Better Wages to the Coal Miners.

Whatever may be said of the injustice of labor demands in certain branches of the iron industry, it is nevertheless certain that the soft coal miners of Ohio and Pennsylvania are entirely justified in asking for an increase in wages, and if the operators do not grant them a reasonable advance they will lose the sympathy of every branch of industry dependent upon the mining business. This is the feeling that prevails among the lake trade, which absorbs a very large part of the Ohio and Pennsylvania product. When the miners were beaten in their last struggle with the operators, mining rates, especially in the Pittsburgh district, were marked down to figures ranging below 40 cents a ton in some of the thick vein districts, and it is well known that the miners, through low wages and unsteady work, have been reduced to a condition of poverty. Operators who have made sales at figures based on this condition among their men should not be taken into account in the question of a settlement between the mine owners and the miners at a reasonable advance over present wages. Of course there is the probability of the men demanding too large an increase in wages, but it is quite generally expected that there will be no great struggle and little delay in mining operations. Advances may not be uniform, and some mines may refuse to make any increase in wages, but it is thought that offers of settlement made to the men will be sufficient to prevent anything like a general suspension of business for a great length of time.

## Canadian Sault Canal.

Another date has been fixed for the opening of the Canadian canal at Sault Ste. Marie. It is now said that the canal will be ready for the passage of vessels of all kinds about the 15th of the present month. There is no announcement, however, regarding the clearing of obstructions in the approaches, and it is not probable the deep-laden vessels will make any use of the canal until the question of clear draft of water throughout the approaches to the lock is settled. A vessel owner who recently visited the Canadian Sault and made inquiry among the engineers regarding the work generally, is of the opinion that some misleading reports, whether intentional or otherwise, have been circulated about the canal.

"There is probably little cause," he says "for the statement that vessels are liable to injure their sides or bilges through contact with the sides of the canal. It has been said that the stone work for a mile or so above the lock on both sides of the canal had been left in the rough and projected inward, in a manner dangerous to all passing vessels. This is hardly borne out by an examination of the canal. The sides of that part of the approach in question are of timber crib to within one or two feet of the surface, and on top of this the stone rough work is laid with a slant outward from the water's surface. The timber crib sides under water project out some two feet, I think, beyond the stone work, so that there is little chance of a vessel striking the stone work under any circumstances. Lake vessel owners and masters who have examined the canal may be familiar with these facts, but I mention them for the reason that I think there has been something of a misunderstanding, and our Canadian friends should be given the full credit to which they are entitled for a big work of this kind."

## Rapid Work on New Lake Charts.

Since the hydrographic office began the publication of charts of the different lakes on single sheets, the demand has been so urgent that the navy officials in charge of this work have been compelled to resort to special measures with the public printers. The charts of Lakes Huron and Superior, which are now on sale, will be followed as soon as possible with similar publications covering Lakes Erie and Ontario on one sheet, and Lake Michigan also on a single sheet, but it will probably be three or four weeks before either of these are in print. In a letter to the REVIEW regarding these charts, Commander Sigsbee, chief of the bureau, says: "Perhaps a statement regarding the work of the engravers will show you that this office has lost no time in pushing forward the lake charts. A week or two before the Lake Huron and Lake Superior charts were issued, I found that the engravers were working voluntarily over time, and on Sundays and holidays, to get the charts done. Another engraver, who desired to resign in order that he might get into a business which promised advancement, voluntarily deferred the date of his resignation until he could complete the chart on which he was engaged. I promptly informed these engravers that I would not require such labor

from them, but they preferred to continue. If any mill grinds faster than the hydrographic office, it ought to be slowed down."

Since these charts have proven of practical assistance to lake vessel masters, more attention is being directed to the work of the hydrographic office and its efforts to be of service to the lake marine. It is evident also that the officers of the hydrographic service feel that their late publications are of more benefit than their first efforts. In the letter referred to above, Commander Sigsbee, writing along this line, says:

"In every work in a new field misapprehension is sure to arise in some place. This office has found that its work on the lakes is no exception to the general rule, and while laboring hard in the interest of the lakes has failed of appreciation in certain places where it should have been most heartily welcomed. But in the main our reception has been most generous and highly satisfactory and the work is growing in popularity very fast. In view of the immense deal of good that this office is doing throughout the world, it can not be possible that it should fail to do a large measure of good on the lakes, if duly supported. Our interest is not in the sale of publications. It is chiefly in the success of the hydrographic service on the lakes. It makes no difference to any officer or employe of the office, pecuniarily, whether the service sink or swim, yet the swimming thereof brings additional work, satisfying to one's sense of official duty but creating very little fame indeed for anybody.

"I have been trying, by the aid of investigation and criticism, to ascertain more clearly just what is needed on the lakes; when I know more precisely, I will do better. I have commanded two steamers and four sailing vessels in my naval career and have a fair knowledge of salt water necessities. It is believed that there is no shipboard practice on the lakes not covered by my own experience, but just what tendency the lake practice takes is something I should like to investigate more fully. Lieut. Blow of the Chicago office has for more than a year been urgently inviting me to make some trips on the lakes, but I have not yet been able to comply. One of these days I hope to be able to have personal talks with some of your leading shipmasters, after which I shall be able to differentiate lake practice and ocean practice."

## Test of Electricity on the Erie Canal.

A practical test of the application of electricity to canal boats on the Erie canal is to be made on an experimental line four miles in length, near Tonawanda. The Trenton Iron Works of New York has made a contract with the Cataract General Electric Company for the erection of the wires and appliances and the power is to be furnished by the Niagara Falls Power Company. The New York state superintendent of public works will look after the interests of the state in all matters pertaining to the trial, as the Cataract General Electric Company is bound by various requirements in the contract from the state giving up the right to apply electricity to the canal.

The system to be adopted will be much the same as that quite generally applied to electric street railways. It is estimated that the cost of the experimental plant will be about \$2,500 a mile for a single line and \$5,000 a mile for a line on each side of the canal. Along each bank of the canal will be erected a pole line, the poles being of steel and extending 16 feet above the ground and outside the towpath. On the top of the poles will be placed a steel cable 1½ inches in diameter. Four inches below this, upon a cable wire, will be strung a second cable, made of steel and 1 inch in diameter. From the upper cable a small car or traveler will be suspended, which will run on the second cable. In the car or traveler there will be a shaft, around which the tower will make three turns. The shaft will be operated by electric motor. The current of electricity will enter the motor from the upper cable and will be discharged through the lower, thus perfecting a metallic current. A motorman will operate the car in much the same manner as the ordinary electric street car. It is expected that the plant will be in operation in about sixty days.

During one day (24 hours) of last week, Thursday, thirty-seven trains delivered 19,878 gross tons of ore at the Two Harbors' docks, and on the following day vessels cleared carrying 35,700 gross tons. These receipts and shipments are largely in excess of any previous records for a single day. Shipments of ore from Ashland for the season up to and including Saturday July 20 aggregated 1,122,071 gross tons.

MASTERS OF LAKE VESSELS CAN NOT WELL AFFORD TO BE WITHOUT THE NEW CHARTS. EXAMINE THEM AT THE OFFICE OF THE REVIEW.



### A Fleet of Yachts in a Dry Dock.

A curious feature in dry docking is shown by a supplement included in this issue. While docking yachts is not the business of the Ship Owners' Dry Dock Co., Cleveland, the picture shows that when such work is undertaken it is done on a wholesale plan. The success attained in placing three yachts in dock at once, getting them on the blocks and stayed properly, is due to the ability of the superintendent of the dock, Mr. Wm. Watterson. Two of these yachts have obtained considerable fame and their combined cost originally was more than that of some of the large modern steel steamers. The *Priscilla* was built for a cup defender, and with her silk sails, when new, is said to have cost \$100,000. The *Say When*, W. J. White's fast steam yacht, was of little less value when she was built. The third boat appearing in the picture is the yacht *Neva*. The peculiar shape of her keel made the placing of her on a single block quite as difficult as the placing of the two larger boats. The work of lengthening dock No. 2 at the Ship Owners' yard is going on rapidly, so that the plant will not only be in readiness shortly to care for the largest vessels now planned, but in nearly all cases can take two of such ships at a time. It is doubtful whether any other docking concern on the lakes is more capable of caring for business.

### Lake Freight Matters.

Although the strike of miners on the Marquette range may continue for some time to come, the number of miners idle is not as yet sufficient to seriously affect the carrying trade of the lakes. The suspension of work has been sufficient, however, to delay advances in ore freights that seemed quite certain before the strike was inaugurated. There is little probability of the mine owners paying the full demands of the men, as most of the mines are producing ore that was sold on a low basis, and in several cases the ore is non-Bessemer and of a kind that is not greatly in demand, even with the improved iron market. It is probable, therefore, that there may be further delay with a settlement. Such is not the case, however, with the threatened troubles in the coal mining regions. It is quite generally admitted that the coal miners are not well paid, and that advances will be made in the majority of cases sufficient to keep the mines in operation. The grain movement out of Chicago shows a little improvement, and a few cargoes have been offered during the past week at Toledo, so that a better general lake freight market is expected shortly.

### Mariposa in the Cleveland Dry Dock.

One of the supplements included in this issue shows the Minnesota line steamer *Mariposa* in the Cleveland dry dock. With the exception of the 400-foot steamers now building, the *Mariposa* belongs to the largest class of steel steamers on the lakes. The view shows, therefore, that the dock is capable of accommodating any of the vessels of this class. In addition to a clear view of the dock and surrounding yard, the picture gives a good idea of the entrance to Cleveland harbor, and the old river bed, which should be widened in order to accommodate steamers of the kind here shown. In this regard the picture is an object lesson to the municipal authorities who are considering the matter of harbor improvements. Old patrons of the dock may be surprised at the veranda that has been added to the office. It is only a comfortable evidence of the improvement which Capt. Brown, general manager, has been making in the general facilities of the plant.

Three new vessels are given a rating, valuation, etc., in the August supplement of the Inland Lloyd's Vessel Register, just issued. The steamer *Bon Ami*, 150 net tons, built at Saugatuck and owned by Rogers & Bird of that place, is valued at \$15,000 and rates A1½. The steam barge *George Farwell*, 600 net tons, and just completed by Alex Anderson of Marine City for J. H. Farwell and others of Detroit, rates A1½\* and is valued at \$50,000. A. Smith & Son's schooner *A. W. Comstock*, hailing from Algonac, Mich., is valued at \$45,000 and given A1\* rating. Her net tonnage is 778. Capt. Alfred Smith will sail the steamer *Geo. Farwell*, and she will tow the schooner *D. P. Dobbins*, which has been thoroughly overhauled.

Some big records in loading ore with steam shovels are reported from Mesabi mines. At the Mountain Iron, where more than twenty acres of ore are uncovered, one steam shovel loaded direct from the ore body, which had been loosened by blasting, 145 cars, or 3190 tons, of ore in ten hours, of which eighty cars had been loaded in five hours. During five days of last week the average number of cars loaded per shift was 117, or 2,677 tons, with one shovel. At the Oliver mine, in nine and one half hours, 112 cars of twenty-three tons each were loaded, and the daily output is about 6,500 tons.

Charles J. Sheffield, who was interested with Mr. Harvey H. Brown in vessel property, died at his home in Cleveland, Friday. The steamer *Chas. J. Sheffield*, sunk several years ago in collision with the Northern line freight steamer *North Star*, was named for him.

### Admiralty Decisions.

BRADLEY TRANSPORTATION CO., VS. TUG JOHN GREGORY.

Judge Ricks, of the United States District Court, Cleveland, a few days ago handed down decisions in two admiralty cases that were tried some time ago. On Sept. 2, 1888, the harbor tug *Forest City*, owned by the Bradley Transportation Co., was sunk in collision with the tug John Gregory. The Gregory was informed that the schooner *Constitution* was bound for Cleveland, and started out to secure the tow. She was overtaken by the *Forest City*, which started out from a point near Rocky River. When the tugs came near each other, some distance from the schooner, "bulling" ensued and the *Forest City* was sunk. Reviewing the testimony, the court says:

"After full consideration, the preponderance of the evidence, it seems to me, shows that the Gregory, having a definite and fixed purpose in view, proceeded on her course for the vessel which she was expecting to tow into the harbor, without any substantial change in the same. The *Forest City*, of course, did not know of the dispatch to the owner of the Gregory, informing him of the tow, and was undoubtedly sailing for the purpose of getting the tow if possible. She crossed the bow of the Gregory so close that one witness says he could have jumped from one tug to the other. After crossing the bow, she slackened her speed and came alongside of the Gregory on her starboard side. From this point on, it is evident that the two tugs were 'bulling' each other, and attempting to throw each other off the course. At this point the master of the Gregory testifies that, knowing that he had the dispatch and was sure of the tow, he said to himself, 'I can afford to let the other tug go ahead,' and checked his boat. This statement, being consistent with the undisputed facts, seems to be natural and reasonable and is easily believed. If I were sure that up to the time the two tugs commenced their 'bulling', the Gregory was in any wise in fault, I would divide the damages for this collision, because it is very evident to me that either one of the masters could have prevented this collision if he had determined to do so. But it seems to me that the preponderance of the evidence shows that the *Forest City* was the aggressor, and that the master of the tug felt that his only hope in getting the tow was to throw the Gregory off her course. This he attempted to do and in doing this was the aggressor all through the maneuver. The Gregory has been injured, but I will not allow her any damages, because even conceding that up to the time the 'bulling' began the *Forest City* was in fault, there was opportunity enough after the 'bulling' began for the Gregory to have gotten out of the way and escaped any injury, so that it was her own negligence which contributed to her injury, and I will not allow her any damages. Two disinterested witnesses who were on the Gregory both swear to the signals given by the master of the latter tug and both aver that no answer came from the *Forest City*. This was the signal for each vessel to keep her own course. I am largely influenced to this conclusion by the consideration that there was every motive for the *Forest City* to interfere with the Gregory's movements, because the master of the *Forest City* supposed that the first tug to reach the *Constitution* would get the tow. Therefore the claim of the captain of the Gregory that he stopped first, feeling secure of his tow, is both natural and reasonable, and is supported by the preponderance of evidence. For these reasons, I think the *Forest City* was in fault, and she is not entitled to recover any damages in this case."

Owners of the *Forest City* will appeal this case.

BRADLEY TRANSPORTATION COMPANY VS. WESTERN TRANSIT COMPANY.

The second opinion given out by Judge Ricks has reference to a case that was very carefully tried, and which involved a number of points of special interest to lake vessel masters. It was a libel filed by the Bradley Transportation Company of Cleveland against the Western Transit Company of Buffalo, to recover damages for the loss of the schooner *Tilden*, which was sunk in the St. Clair river on the night of Oct. 23, 1886, by the steamer *Arabia*. The *Arabia* was found wholly at fault. The *Tilden* was raised sometime after the collision and is now owned by Edward Smith and others of Buffalo. H. D. Goulder was counsel for the Bradley estate in this case, and the *Arabia* was represented by G. B. Hebbard of Buffalo and the late Henry S. Sherman of Cleveland.

On the night of the accident, the *Tilden*, loaded with ore, was anchored below the middle ground, waiting for the steamer *Fay* with the schooner *Rhodes* to come down and pick her up. The *Fay*, with the *Rhodes* in tow, had rounded-to with a starboard helm, head up stream, and after the tow line had been passed and made fast from the *Rhodes* to the *Tilden*, the *Fay* was engaged in straightening up the head of the *Rhodes*, which had sagged out into the channel. While the *Rhodes* had sagged out into the river, her red light showed, so that the master of the *Arabia*, coming down the river, about seven-eighths to a mile distant, claims that he saw only her red light. The master of the *Fay* claims that as soon as he saw the *Arabia* coming down, some seven-eighths to a mile distant, he gave her two blasts of the whistle. She was then about opposite the Sarnia elevator. The *Arabia* continued on her course, observing only the red



light of the Rhodes and assuming her to be an independent sailing vessel approaching the Canada shore. A second blast of two whistles was blown by the Fay and it was answered by the Arabia with two blasts. Notwithstanding these signals, and the response thereto, the Arabia continued her course, apparently heading direct for the Rhodes. As she was about abreast of the Fay, the master says he gave several sharp, short whistles, and called out to the vessel: "Starboard! Why don't you starboard and keep clear of my vessels?" Immediately the master of the Fay says he heard a sharp loud cry on board the Arabia, as follows: "Starboard, man, starboard! Why don't you starboard?" At this time the Arabia was heading for the Rhodes, and instead of starboarding he ported and crossed the Rhodes' bows. Just as he caught the Rhodes' bows, the tow line of the Rhodes was let go. Immediately afterwards the collision between the Arabia and the Tilden took place. This is a brief statement of the manner in which the accident occurred.

The libellant charged that the collision was solely the cause of the gross negligence of the master of the Arabia in going at full speed in the midst of these three vessels when he had fully 1,200 feet of clear water between the Rhodes and the Canada side; that the usual and main channel for heavy vessels going down the river was to go towards the Canada side, and that if the Arabia had taken her usual course, she would not have passed within 600 to 800 feet of the Fay and her tow. It was claimed on behalf of the Arabia that there was no negligence; that when her master saw the red light of the Rhodes he had a right to assume that she was an independent vessel sailing for the Canada shore; that the master of the Arabia had no right to assume that this vessel with a red light was a part of a tow of the steamer Fay, which was showing two white lights at her mast-head.

"A few important facts are clearly established by the preponderance of testimony in favor of the libellant," says the court. The first of these is that the Tilden was anchored in the usual and safe place in the St. Clair river. She was about 340 feet from the dock and some 380 feet from the American shore. The river was 1,900 feet wide opposite the place where the anchor was found, and 1,650 feet wide a little above the middle ground. In 1886, the year of this accident, the main channel of the river was on the Canada side. The Tilden was showing a bright anchor light; the steamer Fay was showing two white masthead lights, indicating that she had a tow, and the usual red and green lights; and the Rhodes, having been in tow, had the usual red and green side lights. With these facts established, ship and tug are one vessel. The masthead lights of the Fay should have indicated to the master of the Arabia that there was a steamer there in tow, and while this may not have been notice to him that the steamer had more than one vessel in tow, yet the fact that a third vessel was near by, showing an anchor light, and that the place where this anchor light was shown was a customary place for vessels to anchor in waiting to be towed, should have put him on his inquiry as to what relation the vessel with the anchor sustained to the steamer and her tow. He had an abundance of time and opportunity to decide this question. He was going at a speed, according to the witnesses, varying from 12 to 17 miles an hour, so that he was about four minutes running from the Sarnia elevator to where he collided with the Tilden. During this time, it was clearly his duty to have watched the lights of these three vessels, and to have determined from their movements what their relation to each other were. If in running at the speed he claims the time was not sufficient for him to solve this question, he should have checked the speed of his vessel in order to clearly determine where his proper course lay with reference to the Fay and her tow. The evidence is overwhelming that the red light of the Rhodes, which the master of the Arabia thought was a light on an independent vessel sailing for Canada, did not materially change its position during the time he was heading for her. Instead of drawing near to the Canada shore, this red light drew nearer to the American shore, as the Fay was straightening the Rhodes up with the stream.

"The only contention of the Arabia's counsel which has any foundation on the facts, is that the master of the Arabia had the right to accept the red light of the Rhodes as indicating that she was an independent vessel moving towards the Canada shore. Assuming this to be true, at the time when it was first seen, it was nevertheless clearly the duty of the master of the Arabia to have continued watching that red light in order to determine whether his first opinion was right. But he must have failed to do this. In fact he substantially states and admits that he acted on his first impression, and that he did not give much attention or consideration to the movement of the red light. Even after the two signals had been given him he had abundance of time to have cleared the tow by keeping his vessel in the main channel. A number of witnesses gave it as their opinion that he could have still escaped the tow even after the danger signals were given.

"The preponderance of testimony is that the sail on the Rhodes was furled. The masters of the Fay and the Rhodes, and all the witnesses on those vessels who were examined, testified positively that the sails were furled before they entered the St. Clair river. It is contended that there

was carelessness on the part of the master of the Fay in maneuvering at the time he took up the Tilden, but the majority of experts who have been examined on this subject testify that the maneuvers of the Fay were proper and usual under such circumstances. There is some testimony offered by the respondent tending to show that the Tilden should have displayed her torch as a signal of danger, and that the Rhodes should have done likewise. The anchor light of the Tilden was in itself a signal that she was at a position of rest, and this signal protected her, according to the rules of admiralty, from any collision with a moving vessel. When such collision occurred, the burden of proof is on the steamer to show that she was free from fault. Many masters of long experience testified that they would not have looked for a torch upon either the Tilden or the Rhodes, and that the absence of such a torch would not, in their judgement, excuse a steamer from running into the midst of vessels grouped as these vessels were under the circumstances as stated."

An appeal will very probably be made in this case also.

### More Steel Schooners—Among the Ship Builders.

The Minnesota Iron Co. is to have two more steel schooners, and it is more than probable that the contract will be awarded within a day or two to the Chicago Ship Building Co. Bids on the boats from nearly all of the steel ship builders on the lakes were opened in the office of Pickands, Mather & Co., Cleveland, on Tuesday, but the contract has not as yet been closed. The vessels will be 50 feet longer and 4 feet wider than the schooners Malta and Marcia, recently built for the same company. The dimensions are 352 feet keel, 44 feet beam and 26 feet hold. They will be built under the rules and inspection of the United States Standard Register of New York, will be fitted with steam towing machines manufactured by the American Ship Windlass Company, and their equipment generally will be similar to that of the two consorts now in commission.

Walter G. Miller, who has held the position of constructing engineer with the Globe Iron Works Co. of Cleveland for several years past, and who has taken part in the design and construction of all machinery for the large number of boats built at the Globe yard since steel has been generally used for ships on the lakes, has resigned his position and will soon depart upon an extended European trip. Mr. Miller will be succeeded by Mr. W. Cowles, who has been with the Cramps of Philadelphia, where he was engaged on gunboat work. Mr. Cowles is now at the Globe works acquainting himself with details of the machinery department. He is known to some Cleveland people as the designer of the city's first fire boat. In the design and construction of machinery for the new United States revenue cutter, a fast boat for which the Globe company has a contract, Mr. Cowles is met at the outset with a job of considerable importance.

Three of the steel canal barges intended for trade between Lake Erie ports and New York, via Erie canal, are now at the Johnson steel plant, Lorain, loading cargo. Success of the enterprise in which these barges are involved will depend largely on results of trials with this first tow. The tow is not complete, as it is intended that the steamboat shall tow five barges, instead of two which she takes on her first trip. The other three boats are under way at the yard of the Globe company, Cleveland. If there are indications of profit in the operation of these six boats, the projectors of the enterprise say they will go ahead with the building of eighteen barges at once, as was the intention at the outset.

Within a few days now something definite will be known of the carrying capacity of the several 400-foot ships building on the lakes. The steamer Victory, first of this type, will leave Chicago Saturday on her maiden voyage. It is not probable that a cargo can be secured for her at Escanaba, but she will load at that port some time during the season, and with the deep draft thus afforded her—better than 16 feet—she may be expected to carry 5,500 to 6,000 net tons. Her capacity on 14 feet draft from Lake Superior will, of course, be a matter of considerable importance also, as all boats of her class will trade largely to Lake Superior.

"Columbia the Gem of the Ocean," selections suited to the pleasing music of the "Pirates of Penzance," and other appropriate airs, will be sung by members of Cleveland's favorite opera company, the Murray-Lane, at the launching of the steel steamer Yale in Cleveland, Saturday. Mr. James Wallace of the Cleveland Ship Building Co. enjoys a personal acquaintance with leading members of the opera company, and they are to oblige him with a novel ceremony in connection with the launching of the big boat.

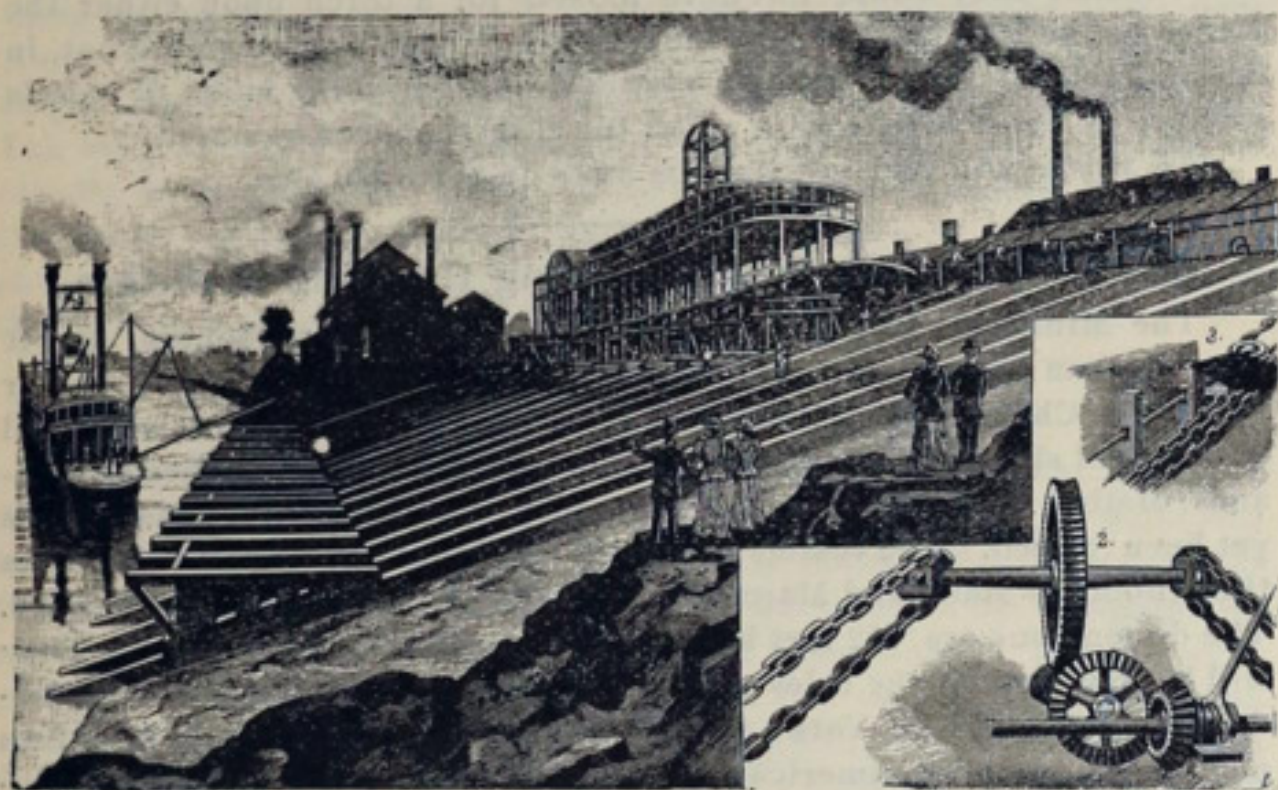
The steel schooner Tyrone, launched by the Globe company, Cleveland, on Saturday last, for Messrs. Irwin, Tener and others, owners of the steamers Harper and Nimick, has all the features of the modern lake consort. She is fitted with an 8-foot steel boiler, which will supply steam for windlass, capstans, deck engine, steering engine, ballast pump, etc. An electric light plant and steam towing machine are also included in her equipment. The boat is 300 feet keel, 41 feet beam and 24 feet deep.



### Plant for Building and Repairing River Boats.

The ship building and repair plant illustrated herewith is located on the west bank of the Mississippi river, seven miles below St. Louis, and is owned by the St. Louis Sectional Dock Co. The river boats are flat bottomed, and seldom draw over four feet, and the structure is especially well adapted for docking such vessels. Steamboats of 1,000 tons have been raised on the inclines, and boats measuring 360 feet in length, 50 feet in width, and 9 feet depth of hold, have been taken up for repairs.

Extending some distance beneath the water are heavy timber ways, shod with iron 8 inches wide, forming tracks with inverted V faces on



which move eight cradles, in whose lower timbers are solid iron wheels that run upon the rails, other wheels running on each side of the ways. At the upper ends of the ways is a shaft running the full length of the dock, and opposite each pair of ways and back of the shaft is countershaft with sprockets on each end, as shown in Fig. 2, the countershaft being revolved by a worm and gear through a pair of bevel gears, one of which runs loose on the main shaft and is thrown into or out of motion by a clutch connection with the main shaft. Large carrier chains, having links 9 inches long, of 1½-inch iron, pass over the sprockets and follow the sides of the ways down to and around idler pulleys at the lower ends of the ways, under water, there being a double chain and sprocket for each way. Another chain is passed around the lower end of each cradle, over pulleys which serve as eveners, and the ends of this chain are carried back a suitable distance and hooked onto the large carrier chains, whereby possible inequalities of movement in the large chains will be prevented from exerting twisting strains upon the cradle. As shown in the illustration, vessels may be and are built upon the upper portion of the ways without interfering with the use of the cradles and lower ends of the ways for docking and repairing other vessels, and, on the completion of a new boat, it is only necessary to run the cradles up under the work, properly support the new construction in connection with the cradles, and lower it into the water. This description of the plant is taken from the Scientific American.

### Simple System of Communicating with Light-Ships.

It is quite generally acknowledged now that in the matter of establishing electrical communication with light-ships the United States light-house board has been more successful than similar institutions in other countries. Great difficulty has been encountered on account of cables twisting and breaking, but there is none of this with the Blake system, which has been adopted at Scotland light-ship, New York, and other places on the coast. The Blake system simply electrifies a field of salt water equal to a ship's length in radius around the mooring of the light-ship. The cable from the shore is run to a spot near the light-ship's anchor, where another and smaller cable is attached to the end of the first and run at right angles to it in both directions. From this new cable again other still smaller cables are run parallel to the first. In this way the field through which the light-ship moves in swinging around her anchor is thoroughly and equally electrified. The telephonic communication is made on board the ship with her anchor cable and establishes perfect transmission from the first, but so strong is this electric current and so efficient is the salt water as its conductor, that a person on any other vessel over the field can, by trailing the positive and negative plates of a telephone in the water over the place where this cable leading to the shore is laid, communicate with perfect ease with persons on the light-ship as well as with those on shore, and can receive, equally well, messages from them. This field is about 600 feet wide, and is found to extend four miles, the entire distance from the light-ship to the shore.

ALL NEW HYDROGRAPHIC CHARTS ARE KEPT IN STOCK BY THE MARINE REVIEW, 516 PERRY-PAYNE BUILDING, CLEVELAND.

### In General.

There are now just 182 full rigged ships floating the American flag. This is a sad showing compared with the days when ships were numbered by the thousand and when the ship yards of Maine turned them out by the hundred each year.

Six new 30-knot torpedo boat destroyers recently ordered by the British admiralty are to be supplemented by twenty more of the same class of vessel. This will give the British government sixty-two torpedo boat destroyers with speeds of twenty-seven knots and upward.

The navy department has received a report made by Naval Constructor Hobson on an inspection of the yacht Defender. The inspection was made at the request of the Herreschoffs, who desired to show the department the value of aluminum in some parts of ship construction. The report is, of course, withheld for the present, but there is no truth in the story of the department planning for a fleet of aluminum torpedo boats.

A composite steam yacht that promises a speed of better than 14 knots an hour has just been undergoing trials at Boston. Her name is Alcedo and she is fitted with an Almy water tube boiler. She was built by George Lawley & Son for G. W. C. Drexel of Philadelphia and is 124 feet over all, 102 feet on the water line, 16 feet 2 inches beam and 6 feet 6 inches draft. Engine cylinders are 10, 15 and 25 inches diameter and the stroke is 13 inches. Circulating, air, feed and bilge pumps are all independent.

Thomas W. Wilson, a seaman in the navy, has submitted to the hydrographic office a device for distributing oil at sea to lessen the violence of breaking waves. The advantage of the device is that the oil is ready for distribution at all times. It consists of a metal tank inclosed in a wooden box, fitted with a door in the side to show the gauge which indicates the quantity of oil in the tank. A rubber tube passes from the bottom of the oil tank through an opening in the top to the surface of the sea. This tube is fitted with a bulb for siphoning the oil from the tank and with a stop cock for regulating its flow.

Naval authorities in Germany, the Netherlands and the United States have been comparing conclusions regarding the visibility of lights at sea. The word "visible" in the experiments means visible on a dark night with a clear atmosphere. About the same results are shown in reports from the different governments. A white light of one candle power is visible at one nautical mile on a dark night with very clear atmosphere; one of 3½ candle power is visible at two miles and one of sixteen candle power at five miles. For a green light the power required was two candle power, one mile, and fifteen candle power, two miles. Results of tests with a red light were about the same as with the green, but it was conclusively proven that a white light was much more easily seen.

The German emperor seems to have taken a special interest in the U. S. S. New York during the celebration at Kiel. After dining aboard the New York, the emperor expressed a desire, about 1 o'clock in the morning, to see the engine room. He timed the uncoupling of the star-board engine, the work being done by four men, working two at a time, in two minutes and forty-five seconds. The next day the engineer of the royal yacht Hohenzollern and the engineers of most of the other German vessels were sent by the Kaiser on board the New York to inspect her engine rooms and learn how clean the engine rooms of a steamer might be kept. Following the performance in the engine room—about 2 o'clock in the morning when the men were curled up in their hammocks—the watertight compartments were closed at the emperor's request, the time taken being one minute and a half. He surprised Capt. Evans by asking how long it would take to beat to quarters. Capt. Evans replied: "Just touch that button and we'll show you." The time was one minute and forty-eight seconds.

### Patents on Steam Towing Machines.

As it is more than probable that steam towing machines, which are now in use on several lake vessels, will before long be quite generally applied to the better class of tows, it may be interesting to give some extracts from patent specifications covering the machine manufactured by the American Ship Windlass Co. of Providence, R. I. The illustrations accompanying these specifications are also reproduced. The first general letters patent on this apparatus are numbered 383,917 and were taken out by T. Jackson Shaw of Wilmington, Del., and John M. Spiegle of Philadelphia, Pa. All details of the machinery are shown in the first set of diagrams that follow. Fig. 1 is an end elevation of the machine, Fig. 2 is a plan view of same and Figs. 3 and 4 are detail views showing the regulating pressure valve with its screw shaft and connections. The operation of the invention is thus explained: The pressure of the engine cylinders G will normally counterbalance the strain or lead on the cable, and the drum will thus remain stationary; but when, owing to the pitching of the vessels, a sudden strain comes on the cable the latter will pay out somewhat, and in so doing the steam or air in the engine cylinders will have a cushioning effect to prevent injurious jerks on the cable. As the cable pays out, the drum will be turned, and thus the bevel-gear k on the drum-shaft will turn the screw shaft or spindle J, through

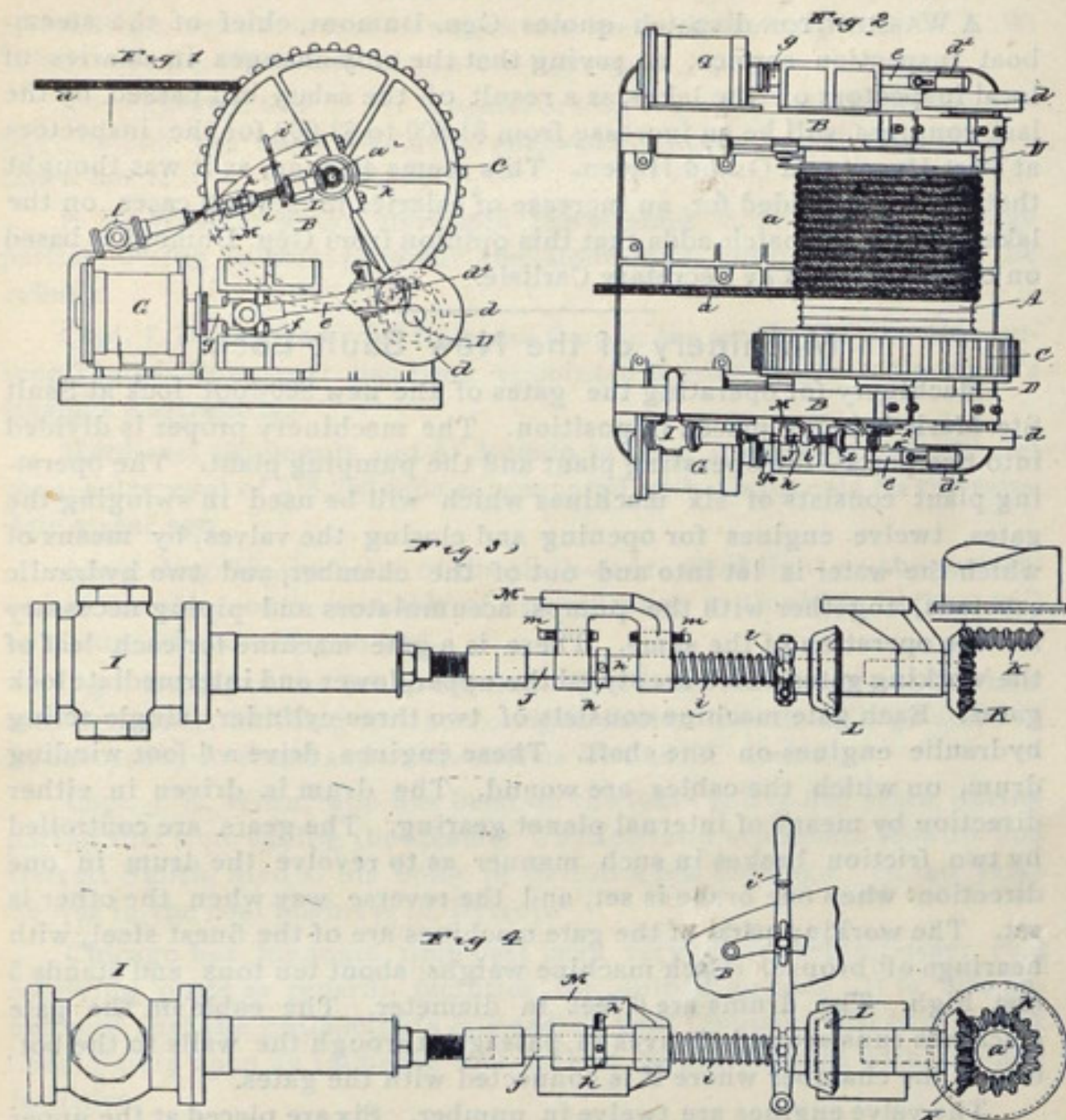


the gear K, to open or enlarge the steam passage of the pressure regulating valve I, and thereby increase the steam pressure of the engine cylinder or cylinders to counterbalance the load on the cable. When the strain is lessened, these operations are reversed, and the pressure is reduced to the equality of the load on the cable as the latter is hauled in by the re-

cylinder or cylinders is increased as increased strain on the cable causes the latter to be paid out and is diminished as the strain on the cable is lessened and the latter is hauled in."

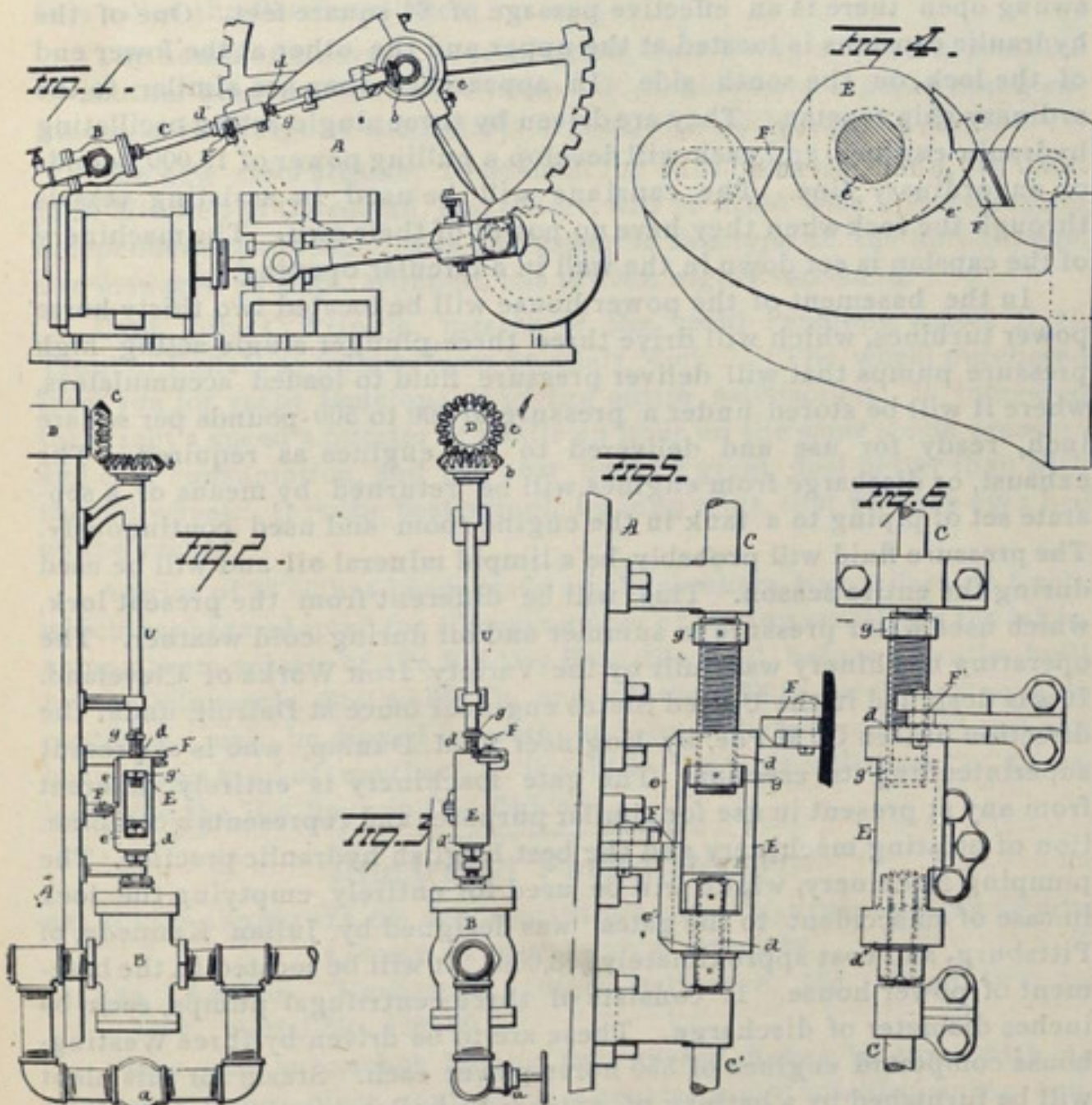
Since acquiring control of the machine, the American Ship Windlass Co. has secured additional patent rights on improvements. The improvements relate to the manner of controlling the pressure in the engine cylinder, making the machine entirely automatic. The following drawings give details of these improvements. Fig. 1 is a side elevation of the apparatus having the regulating valve and gear mounted upon and connected to it; Figs. 2 and 3 are plan and side elevations, respectively, of the regulating valve, screw shaft and connections; Figs. 4, 5 and 6 are end view, plan and side elevations, respectively, of the connecting nut and sleeve; and Fig. 7 is a plan view. To allow for paying out or taking in the hawser a by-pass is provided by the improvement around the regulating valve, so that pressure may be supplied to the engine cylinder or cylinders without passing through the regulating valve, this by-pass being provided with a valve *a*, which is normally closed.

The operation of paying out the hawser is as follows: The main admission and by-pass valve are opened, the reversing mechanism being in position to unwind rope from the drum. The machine unwinds rope until the full length required is paid out, when the by-pass valve is shut

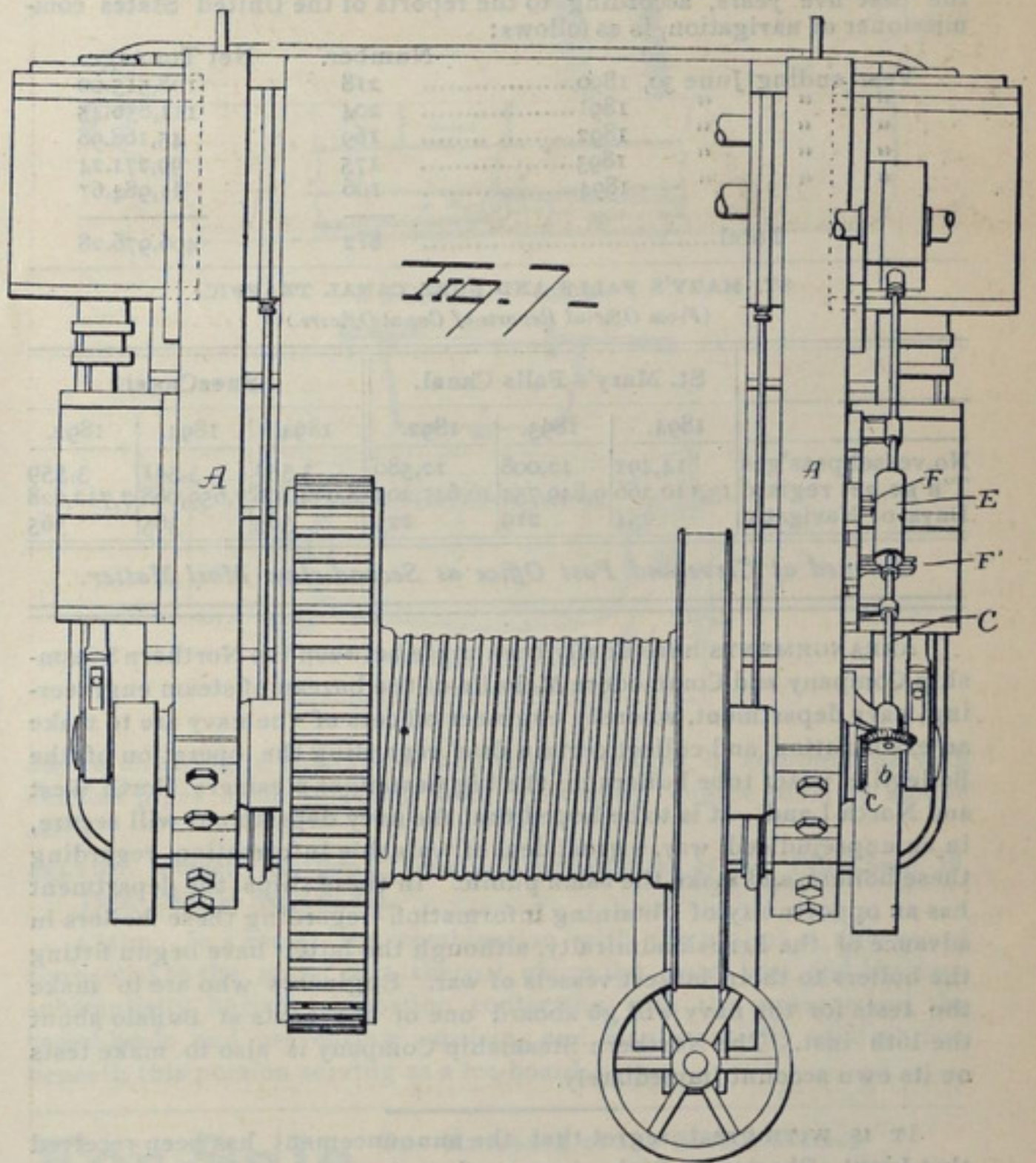


verse turning of the drum by the engine. The movements of the screw shaft J to vary the pressure of the pressure regulating valve will be restricted within certain limit by the screws *m*, and if the said shaft be not turned far enough in either direction to have its movements thus limited the collar *h*, with its pin or projection *h'*, will simply oscillate back and forth between the said screws as the weight of the load on the cable is increased or diminished.

In the first set of specifications giving the above drawings of the machine and the foregoing explanation of its operation, the following



claim is made: "In a towing machine, the combination, with a cable drum, of an engine, the shaft of which is geared to said drum to balance the load on the cable, and a pressure regulating valve located in the steam passage to the engine cylinder or cylinders and operatively connected with the shaft of said drum, whereby the pressure of the engine



and the engine reversed. As herein before shown, the gearing and screw shaft will have fully opened the regulating valve B, and the excess of pressure in the engine cylinder will cause the machine to wind on rope, also partly closing the regulating valve until the cylinder pressure balances the strain on the rope. To take up rope the by-pass valve is opened, the reversing mechanism being normally in the position to wind rope on the drum, and the excess of pressure causes the machine to take up rope, the regulating valve being gradually closed, as before shown, until the full length of rope is wound on. The by-pass valve is now closed and the reduced pressure in the engine cylinder causes the rope to unwind until the regulating valve has been opened sufficiently to bring the cylinder pressure to an equality with the strain on the rope.

Claims made for these improvements are: "In a towing machine, the combination of a pressure regulating valve located in the admission passage to the engine cylinder or cylinders, with a valve on a by-pass whereby admission may be had to the engine cylinder or cylinders without passing through the pressure regulating valve, a screw spindle or shaft, a nut and sleeve containing projections which hit on suitably placed pawls and gearing, whereby the pressure of the engine cylinder or cylinders is increased as increased strain on the hawser causes the latter to be paid out, and is diminished as the strain on the hawser is lessened and the latter is hauled in, and a reversing mechanism to change the direction of motion of the engine."





DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 516 Perry-Payne building, Cleveland, O

The books of the United States treasury department contain the names of 3,341 vessels, of 1,227,400.72 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons and over that amount on the lakes on June 30, 1894, was 359 and their aggregate gross tonnage 634,467.84; the number of vessels of this class owned in all other parts of the country on the same date was 316 and their tonnage 642,642.50, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1894, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,731	843,239.65
Sailing vessels.....	1,139	302,985.31
Canal boats.....	386	41,961.25
Barges.....	85	39,214.51
Total.....	3,341	1,227,400.72

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Net Tonnage.
1890.....	218	108,515.00
" " " 1891.....	204	111,856.45
" " " 1892.....	169	45,168.98
" " " 1893.....	175	99,271.24
" " " 1894.....	106	41,984.61
Total.....	872	406,976.28

#### ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1894.	1893.	1892.	1894.	1893.	1892.
No. vessel pass'ges	14,491	12,008	12,580	3,352	3,341	3,559
T'n'ge, net registd	13,110,366	9,849,754	10,647,203	8,039,106	7,659,068	7,712,028
Days of Navigat'n	234	219	223	365	365	365

Entered at Cleveland Post Office as Second-class Mail Matter.

ARRANGEMENTS have finally been made between the Northern Steamship Company and Commodore Melville of the bureau of steam engineering, navy department, whereby engineer officers of the navy are to make an examination and collect certain data regarding the operation of the Belleville water tube boilers in the big passenger steamers North West and North Land. It is to be hoped that the navy department will secure, in an unprejudiced way, a great deal of valuable information regarding these boilers, and make the same public. In these ships the department has an opportunity of obtaining information regarding these boilers in advance of the British admiralty, although the latter have begun fitting the boilers to their largest vessels of war. Engineers who are to make the tests for the navy will go aboard one of the boats at Buffalo about the 15th inst. The Northern Steamship Company is also to make tests on its own account immediately.

IT IS WITH great regret that the announcement has been received that Lieut. Charles S. Riche, corps of engineers United States army, who has for some time past been at Sault Ste. Marie in charge of important survey work under the direction of Gen. Poe, has been ordered to New York harbor on duty connected with the battalion of engineers. Lieut. Riche was nearing the completion of a re-survey of St. Mary's river, from which valuable charts are to be made. He was especially adapted to work of this kind and has always shown a deep interest in all matters pertaining to lake surveys. More than this, he was inclined to seek information and assistance from the vessel owners, whose interest he was serving. He made more friends than any of the younger men in the government service who have been assigned to the lakes.

EXECUTIVE officers of the Lake Carriers' Association are again in Cleveland to-day (Thursday) planning methods to overcome the efforts of certain hard coal shippers in Buffalo, who are offering fuel at low prices with a view to breaking up the agreement among vessel owners not to buy fuel under any circumstances from the hard coal shippers. General publicity will be given to the methods of the Buffalo shippers, and it is more than probable that the vessel owners will be found holding to their agreement throughout the season.

PRESIDENT INGALLS of the Big Four railway is said to be planning for the building of docks on lake front property controlled by Vanderbilt interests in Cleveland. Mr. Ingalls has a knowledge of ships and water

transportation, as well as the railway business, and he may have his eye on trade that is being taken from railways through boats running between Cleveland and Buffalo. He has built up a large export business that goes from lake states down to Newport News, Va., where he controls a big line of boats running to Liverpool.

A WASHINGTON dispatch quotes Gen. Dumont, chief of the steamboat inspection service, as saying that the only changes in salaries of local inspectors on the lakes, as a result of the salary bill passed by the last congress, will be an increase from \$1,800 to \$2,000 for the inspectors at Port Huron and Grand Haven. This seems strange, as it was thought that the law provided for an increase of salaries in several cases on the lakes, but the dispatch adds that this opinion from Gen. Dumont is based on certain rulings by Secretary Carlisle.

#### Machinery of the New Sault Lock.

Machinery for operating the gates of the new 800-foot lock at Sault Ste. Marie is being placed in position. The machinery proper is divided into two parts—the operating plant and the pumping plant. The operating plant consists of six machines which will be used in swinging the gates, twelve engines for opening and closing the valves, by means of which the water is let into and out of the chamber, and two hydraulic capstans, together with the pumps, accumulators and piping necessary for the operation of the same. There is a gate machine for each leaf of the working gates which are styled the upper, lower and intermediate lock gates. Each gate machine consists of two three-cylinder, single-acting hydraulic engines on one shaft. These engines drive a 6-foot winding drum, on which the cables are wound. The drum is driven in either direction by means of internal planet gearing. The gears are controlled by two friction brakes in such manner as to revolve the drum in one direction when one brake is set, and the reverse way when the other is set. The working parts of the gate machines are of the finest steel, with bearings of bronze. Each machine weighs about ten tons and stands 5 feet high. The drums are 6 feet in diameter. The cable on the gate machines runs around sheaves in passages through the walls to the bottom of the chamber where it is connected with the gates.

The valve engines are twelve in number. Six are placed at the upper end and six at the lower end of the lock. They are direct acting horizontal cylinders and move the valves by connecting rods, which run from the crossheads to valves. These engines are operated by vertical valves placed on top of the south wall, which are connected with them by piping in such a way that each valve controls two engines. Twelve valves are used in filling and emptying the lock chamber. The valves and frames are of the best wrought steel. They are 8 by 10 feet in size and are carried on solid steel trunnions 10 inches in diameter. The valves are 3 inches thick on the edges and 16 inches in the middle. When they are swung open there is an effective passage of 64 square feet. One of the hydraulic capstans is located at the upper and the other at the lower end of the lock, on the south side. In appearance they are similar to the ordinary ship capstan. They are driven by three single-acting oscillating hydraulic engines, and each will develop a pulling power of 19,000 pounds on an ordinary line. The capstans will be used in assisting vessels through the lock when they have no power of their own. The machinery of the capstan is set down in the wall in a circular opening.

In the basement of the power house will be located two thirty horse power turbines, which will drive three three-plunger single-acting high pressure pumps that will deliver pressure fluid to loaded accumulators, where it will be stored under a pressure of 300 to 500 pounds per square inch, ready for use and delivered to the engines as required. The exhaust, or discharge from engines will be returned by means of a separate set of piping to a tank in the engine room and used continuously. The pressure fluid will probably be a limpid mineral oil and will be used during the entire season. This will be different from the present lock, which uses water pressure in summer and oil during cold weather. The operating machinery was built by the Variety Iron Works of Cleveland. It was designed in the United States engineer office at Detroit, under the direction of Gen O. M. Poe, by Engineer F. M. Dunlap, who is at present superintending its erection. The gate machinery is entirely different from any at present in use for similar purposes and represents a combination of hoisting machinery and the best English hydraulic practice. The pumping machinery, which will be used for entirely emptying the lock in case of an accident to the gates, was designed by Julian Kennedy, of Pittsburg, and cost approximately \$88,000. It will be located in the basement of power house. It consists of three centrifugal pumps, each 30 inches diameter of discharge. These are to be driven by three Westinghouse compound engines of 350 horse power each. Steam for this plant will be furnished by a battery of water tube boilers, set in steel casings. It is expected that the lock can be emptied in six or seven hours. The pumps were built by the Southwark Foundry and Machine Co., Philadelphia; the engine by the Westinghouse Engine Co., Pittsburg, and the boilers by the Babcock & Wilcox Co., New York.—Sault Ste. Marie News.



### Around the Lakes.

America's fastest trotting horses are in Cleveland this week and so is Capt. James Millen of Detroit.

The Steamer Emma E. Thompson, with debts aggregating \$9,000, was sold in Chicago, Wednesday, for \$7,000.

A 10 per cent. increase in wages was made at the ship yard of F. W. Wheeler & Co., West Bay City, a few days ago.

It is expected that F. W. Wheeler & Co., West Bay, will today (Thursday), launch the steel steamer Penobscot, first of the 400-foot Eddy-Shaw boats.

F. W. Wheeler & Co. have sold the steamer E. S. Tice to Chicago parties, taking in part payment the steamer St. Joseph, which will be rebuilt.

Capt. J. Dunn, who was for some time in the employ of the Menominee Transit Company, has been appointed master of James Corrigan's steamer Australasia.

Hard coal shipments out of Buffalo to Aug. 1, aggregate 829,829 net tons, a decrease of 215,250 tons as compared with shipments on the same date a year ago.

About Aug. 15, the color of the sixth-order fixed light on the easterly end of the pier, south-west side of the entrance to Dunkirk harbor, will be changed from white to red.

Capt. McKay of the schooner Geo. W. Adams will bring out the new steel schooner building for the Corrigan fleet at South Chicago and will be succeeded in command of the Adams by Geo. H. Daniels.

Capt. J. E. Winn, who has been on the lakes thirty-five years, during part of that time sailing the steamer Westford and schooners Monitor and Gerrett Smith, died at his home in Detroit a few days ago. Of late years he was in the coal business in Detroit.

Chicago has for some time past been very much behind other coal receiving ports as regards facilities for unloading coal. It is now announced that the Philadelphia & Reading Coal Company will begin work immediately upon an immense coal dock at South Chicago with modern facilities.

Two new steam vessels from the lakes, the canal boat Alpha of Cleveland and the small steamer Goodwill of Buffalo, were registered last week in the office of the United States commissioner of navigation. The Alpha's tonnage is 132.23 gross and 85.08 net and her official number is 127,098. The Goodwill's tonnage is 65.63 gross and 44.63 net.

### Trade Notes.

L. Black & Co., 145 Woodward avenue, Detroit, Mich., are putting a new marine glass on the market that is excellent for night or day use. It is called the Par Excellence.

The house of Henry R. Worthington, New York, is now represented by another branch office on the lakes. F. B. Slocum, a capable young engineer, is in charge of the Detroit branch, No. 155 Jefferson avenue.

The new steel steamer to be built by F. W. Wheeler & Co. for Capt. John Mitchell of Cleveland, and others, will be fitted with a Worthington independent condenser. The condenser of this type on the McWilliams, also managed by Capt. Mitchell, has proven highly satisfactory.

Capt. John C. Pringle, master of the yacht Penelope, writes H. G. Trout of Buffalo as follows from St. Clair, Mich.: "The wheel purchased from you for yacht Penelope is giving entire satisfaction. It increased the yacht's speed a quarter of a mile an hour on the same steam pressure and coal consumption, and the boat backs a great deal better than with the old wheel. It is the best wheel, by long odds, that we have ever had on the yacht."

A price of \$3.50 has been made on the Graham-Meyer flare-up torch, which has been adopted for a large number of towing vessels on the lakes, among them vessels of the Bradley fleet, the steel barges recently built by the Minnesota Steamship Co. and others. This torch is always in readiness, may be dipped in water and immediately relighted and will burn in any kind of weather. It is sold by the Upson-Walton Co., Cleveland, and the H. Channon Co., Chicago.

### Illustrated Patent Record.

SELECTED ABSTRACTS OF SPECIFICATIONS OF A MARINE NATURE—FROM LATEST PATENT OFFICE REPORTS.

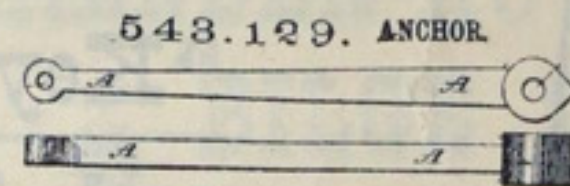
543,129. Anchor. Herbert O. Dunn, Baltimore, Md. Filed Oct. 19, 1894. Serial No. 526,380.

Claim. In an anchor having two spread flukes integral with an elongated crown piece containing a central longitudinal opening contracted on the fluke side; an enlarged headed shank with a wedge shaped point having two plane bearing faces forming an acute angle at end of shank head, one face of which bears against the inside of central longitudinal opening of crown while neck of shank takes against the other side to relieve bolt strains, said shank head actuating in longitudinal

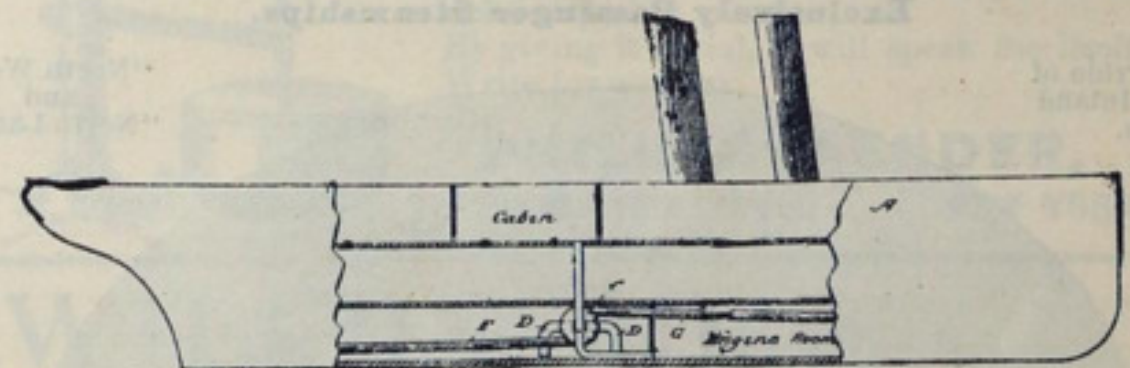
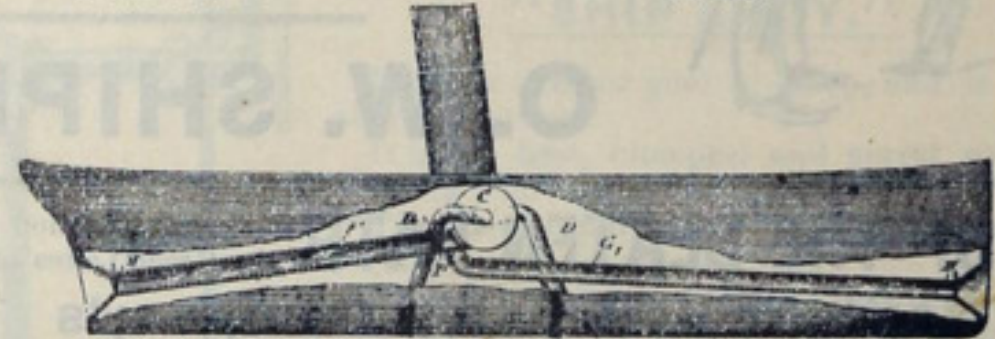
crown opening and containing a transverse cylindrical opening in combination with an axial bolt passing transversely through both shank head and crown piece allowing flukes to actuate each side of shank.

543,179. Means for Propelling Vessels. Benjamin A. Davis, New York, N. Y. Filed July 13, 1894. Serial No. 517,424.

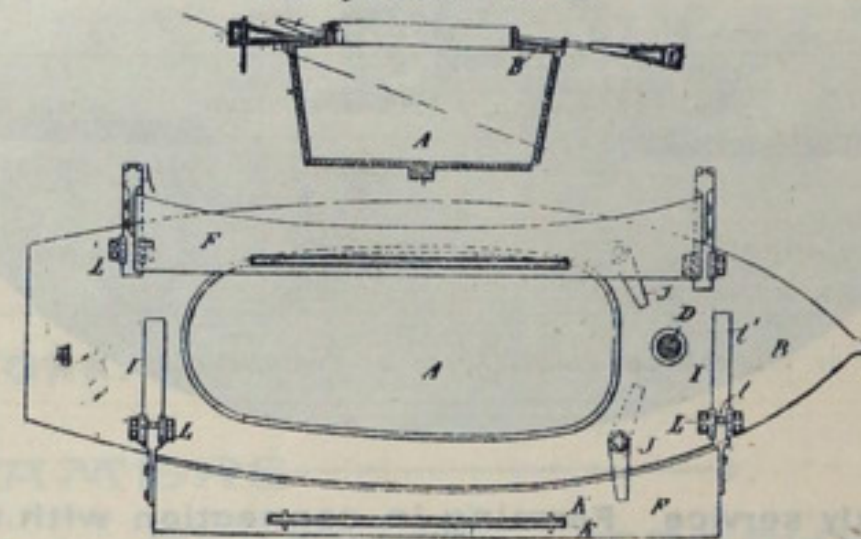
Claim. A vessel having one or more air conduits F G extending from a blower C, said air conduits being continuous and uniform in diameter,



543.179 MEANS FOR PROPELLING VESSELS



543,210. VESSEL



and terminating in enlarged or bell shaped mouths, in combination with exhaust pipes communicating with the cabins, engine room or smoke stack.

543,210. Vessel. Nathan C. Jessup, Westhampton, N. Y. Filed Sept. 19, 1892. Serial No. 446,341.

Claim. In a vessel, the combination with the hull of a side guard connected to the upper part thereof above the water line and having a substantially horizontal portion contacting with the water when the vessel heels and preventing capsizing and a substantially vertical face beneath this portion serving as a lee-board.

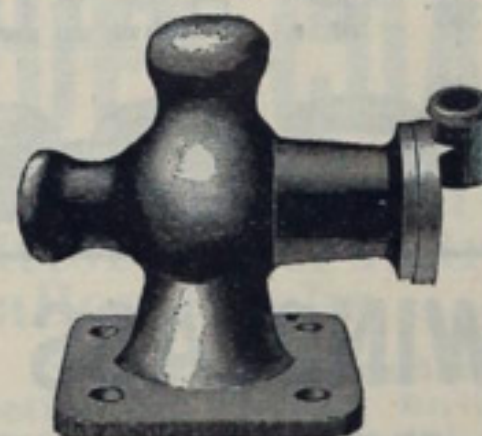
## For Sale One-sixteenth of the Steel Steamer JOHN W. MOORE.

This is a good investment, as the steamer is under charter for the season with the Lackawanna Transportation Co. (D. L. & W. Ry.) Address offers to

Aug. 10. MITCHELL & CO., 510 Perry-Payne Building, Cleveland, O.

## Enos Combined Bitt, Winch and Sheet Holder.

Patented U. S. A., England and Canada.



Takes the place of wooden or iron bitts and forms a Combination Bitt and Winch. Takes up less room than the ordinary bitt. Can be used to great advantage as a Windlass or Sheet Holder on Yachts. An examination will convince you of the many uses to which it can be put.

### FOR SALE BY

H. Channon & Company, Chicago, Ill.  
Upson, Walton & Co., Cleveland, Ohio.  
Howard H. Baker & Co., Buffalo, N. Y.  
M. I. Wilcox Cordage & Supply Co., Toledo, O.  
H. D. Edwards & Co., Detroit, Mich.  
Henry Beckman & Son, Erie, Pa.  
And by Ship Chandlers in every seaport city, lake port and town.

**THE ENOS SHEET HOLDER CO.**  
Manufacturers and Proprietors, PEABODY, MASS.





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We have Four Large CHUTES on our Docks at AMHERSTBURG, ONTARIO, 1,000 FEET RIVER FRONT and Day and Night Force.

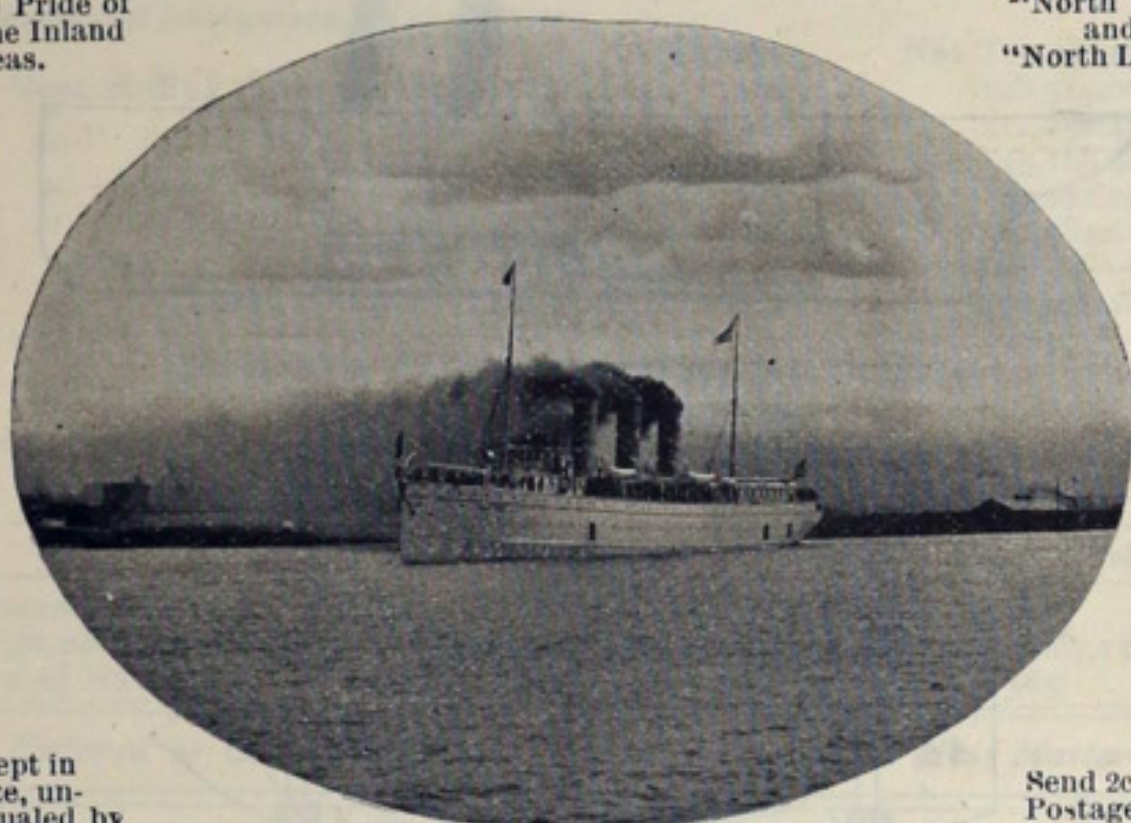
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**and Best Grades of Hocking Coals.**

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The **Northern Steamship Company's**  
Exclusively Passenger Steamships.

The Pride of  
the Inland  
Seas.



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and  
"North Land."

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**H. CHANNON COMPANY**

AGENTS FOR  
**RYLANDS BROS.**



MANUFACTURERS OF  
**ENGLISH GALVANIZED STEEL HAWSERS.**

24-26 Market Street, **CHICAGO, ILL.**

**HOWARD H. BAKER & Co.**  
**Ship Chandlers and Sail Makers,**  
18 to 26 Terrace. **BUFFALO, N. Y.**

**DUNFORD & ALVERSON,**  
PORT HURON, MICH.

Length, 400 feet,

Width:

On top, 95 feet,

Bottom, 55 "

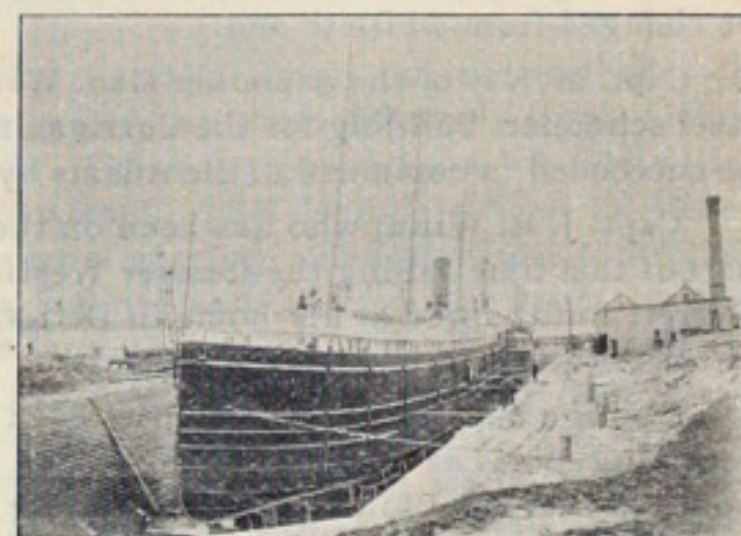
Gate, 62 "

Depth:

To Floor, 20 ft.

To Sill, 18 ft.

On Blocks, 16 ft.



Dry Dock large enough to dock the largest steamers on the lakes.  
Docking, Repairing and Spar Making. Dock has pit to ship rudders.  
THIS IS THE NEAREST MODERN DOCK TO THE SAULT OR MACKINAW.



**NAUTICAL WATCH CHAIN.**

Solid Gold. Ship-shape in every detail.  
Send for Descriptive Circular.

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Look out for **Graham's Coal Dock**, foot of 21st St., Detroit.  
1,000 Tons, best quality, on hand all the time **Fresh on Cars.**  
You can get it from **Chutes, High Platform or Dock.**

Chutes fit highest or lowest boats, and can give as quick dis-  
patch as at any dock. Widest point on the river, and noth-  
ing to interfere in rounding to with tows.

**No Car Boats, Ferry Boats or Elevators in the way.**  
**Ten Minutes Ride to City Hall.** Supplies right at hand.

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Stud and Close Link,  
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BUILDERS OF THE

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350 STYLES AND SIZES.  
OVER 5000 IN USE.

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**FRANK S. MANTON, AGENT.**



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Manufacturers and dealers in Ship Machinery, Windlasses, Capstans, Winches, Pumps, Brass Work, "Monitor" Side and Deck Lights, Cannon, Rails, Stanchions.  
Ship Chandlery and Engineers Supplies, Cordage, Oakum, Wire Rope, Anchors, Chain, FLAGS AND SIGNALS, Hose, Packing, Oils, Waste, etc., etc.

Estimates furnished for complete outfits for vessels.

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**Torches and Liquids for Lights of Various Colors,  
For Signal Lights and Illuminations of all kinds.  
Blue Flash Lights a Specialty.**

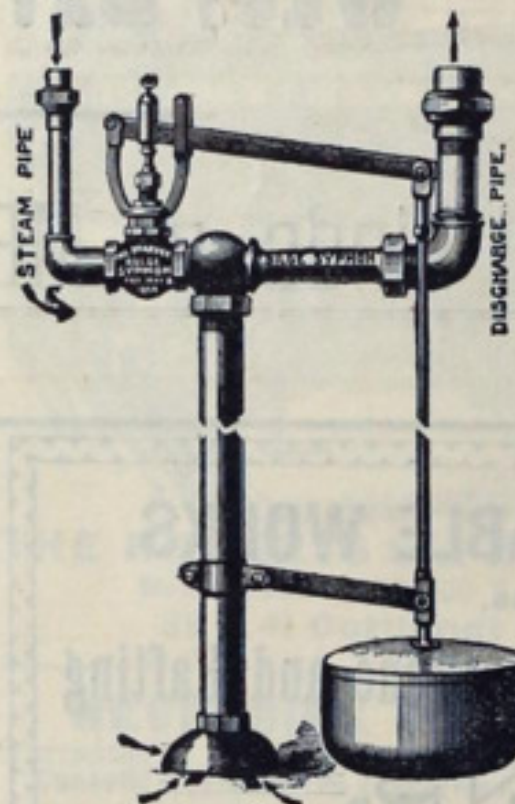


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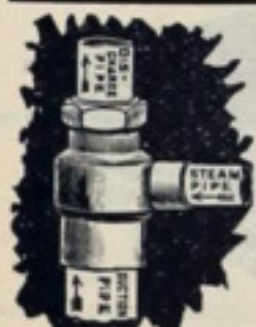
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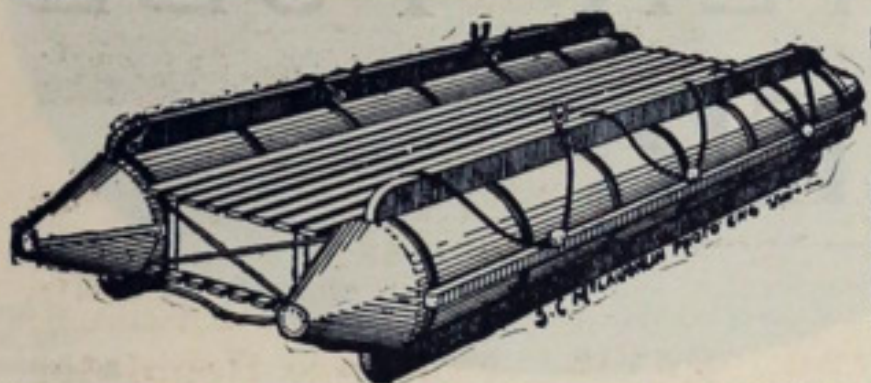
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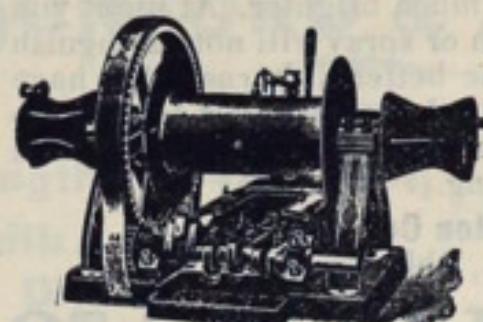
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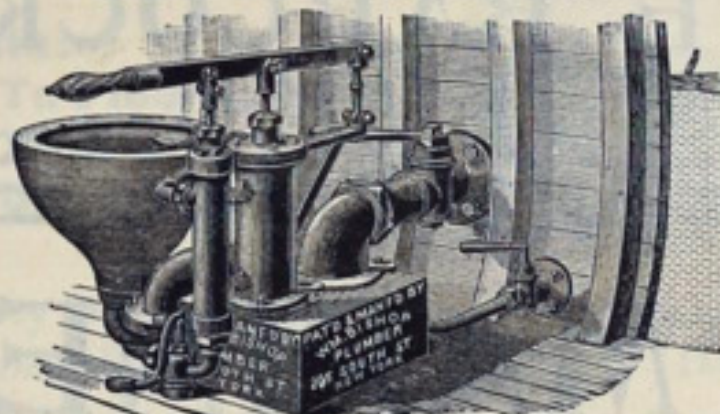
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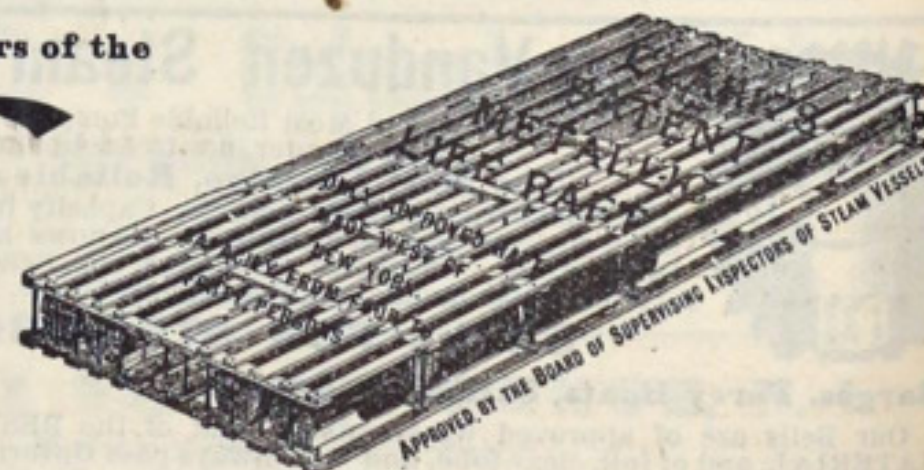
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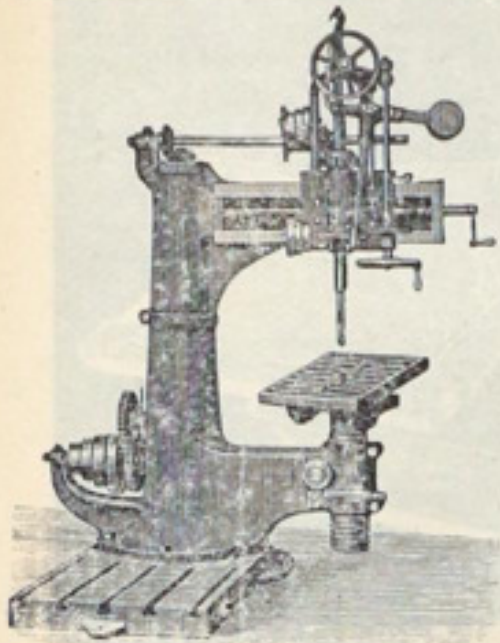
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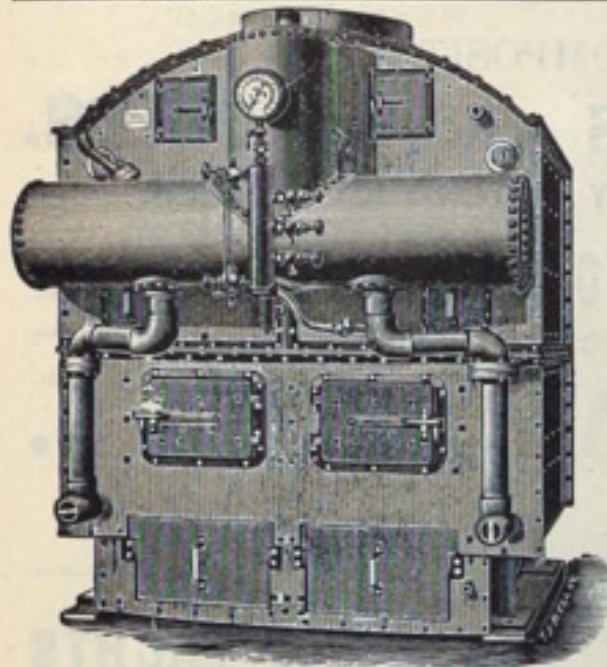
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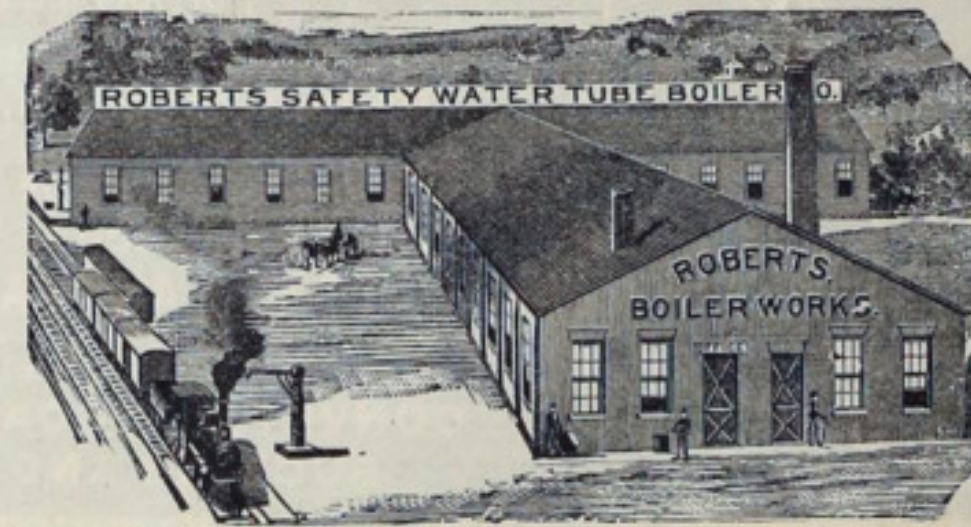
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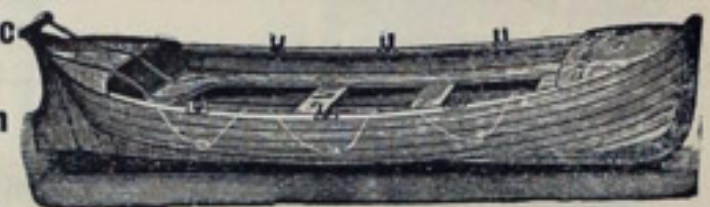
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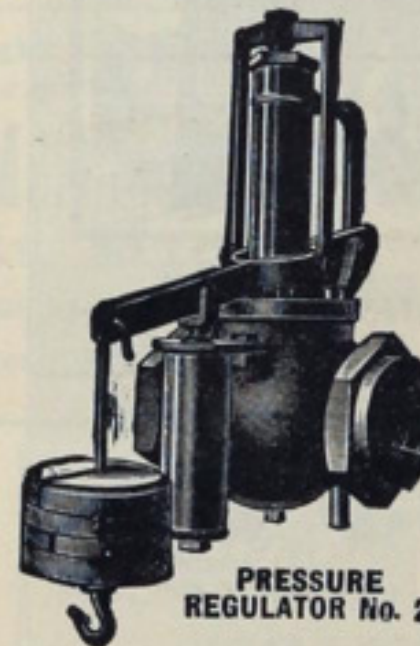


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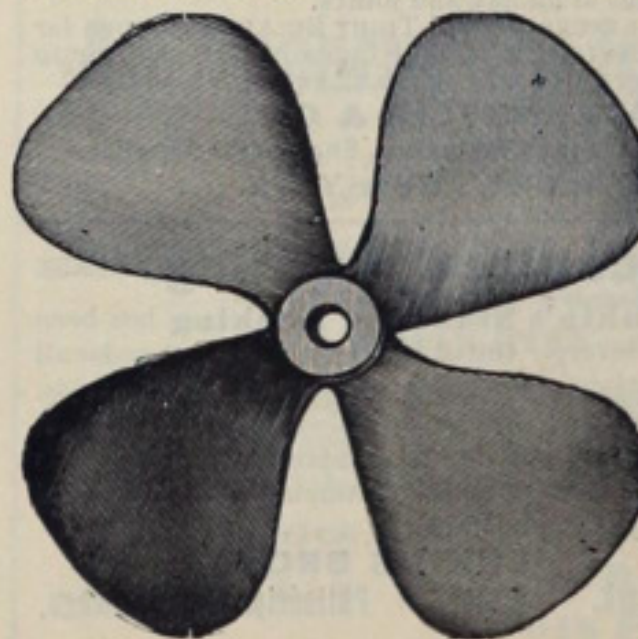
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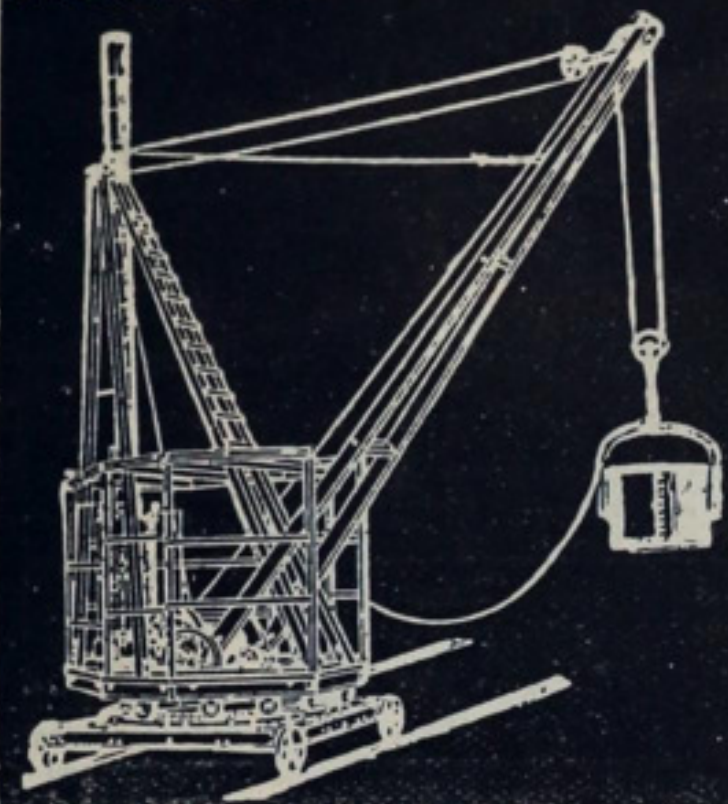




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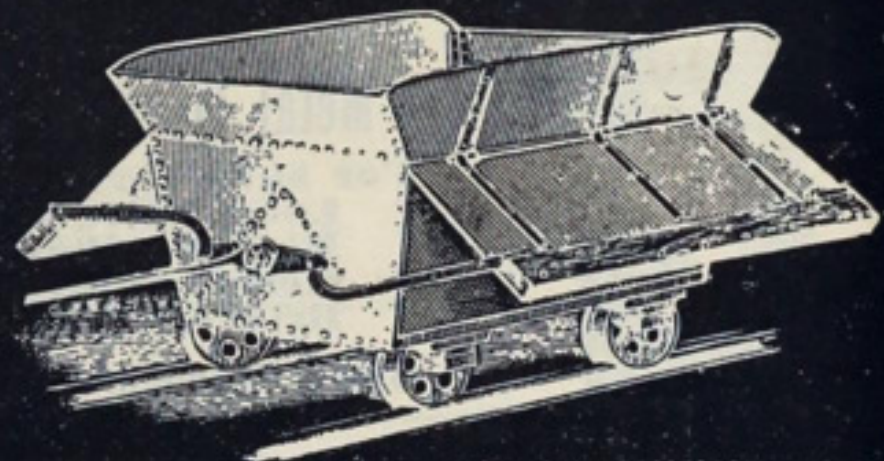


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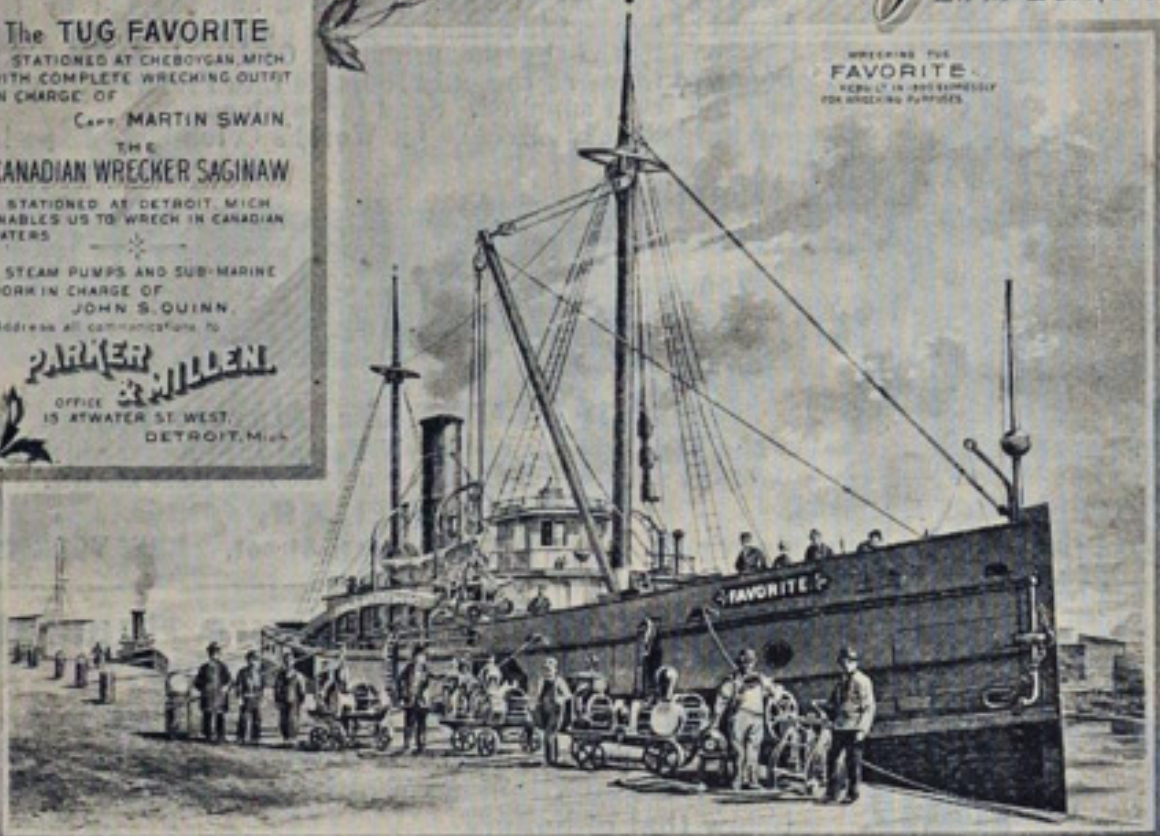
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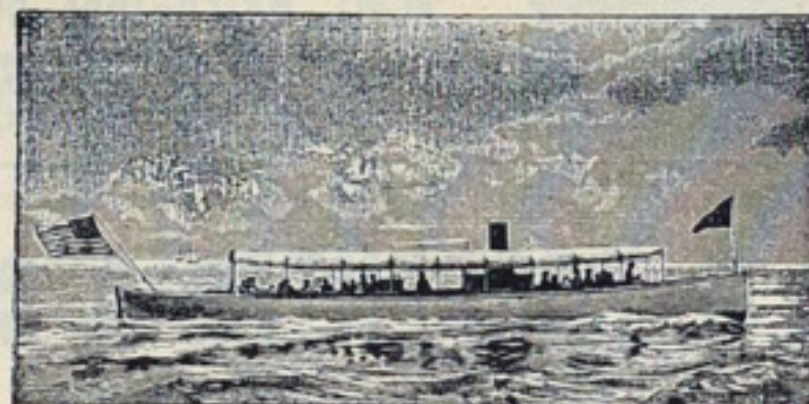
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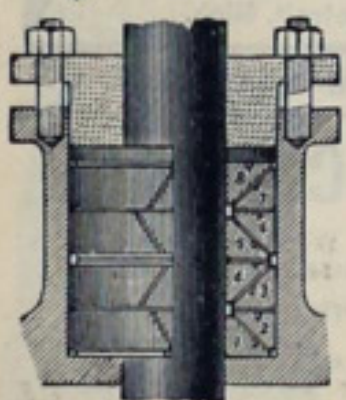
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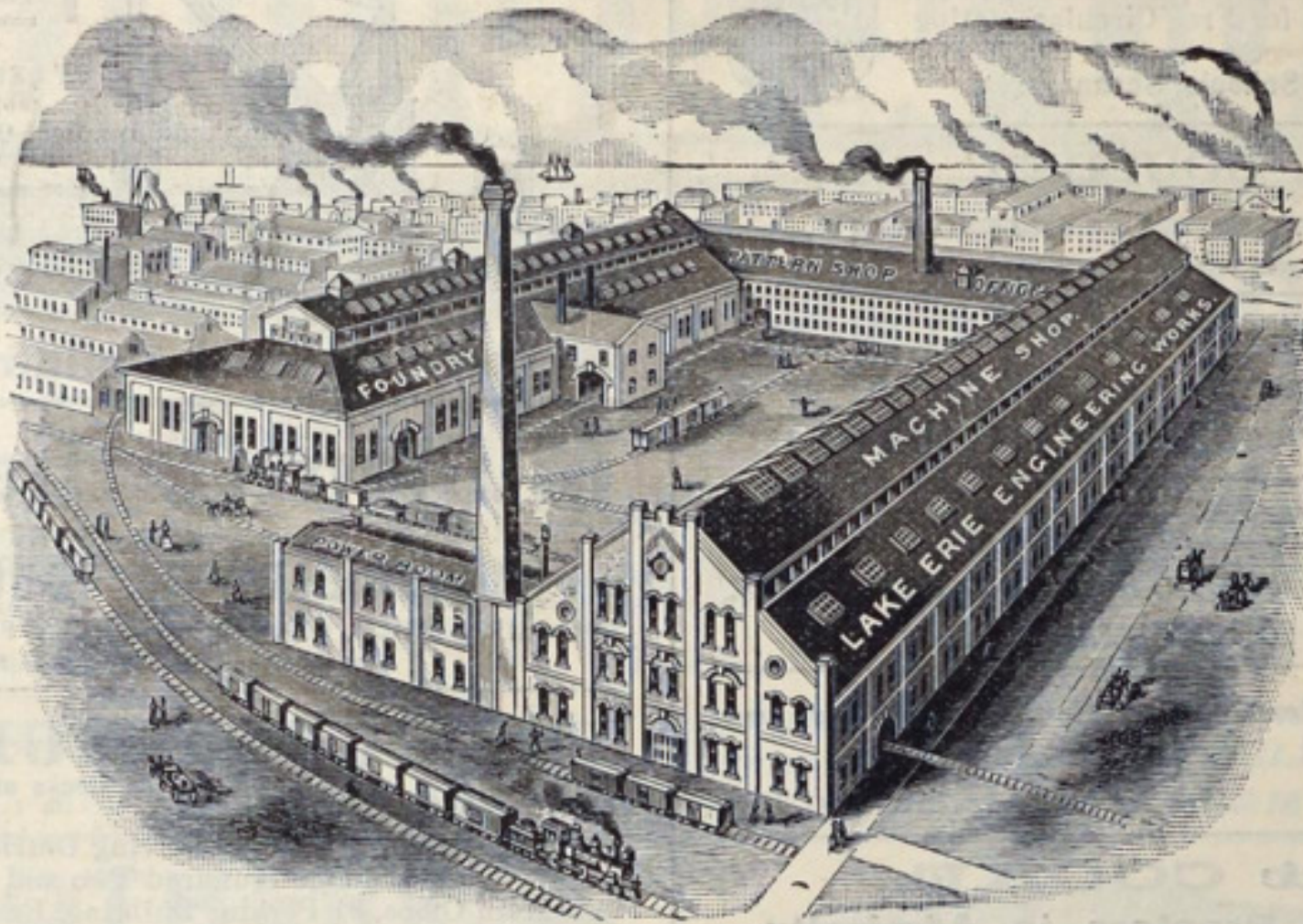


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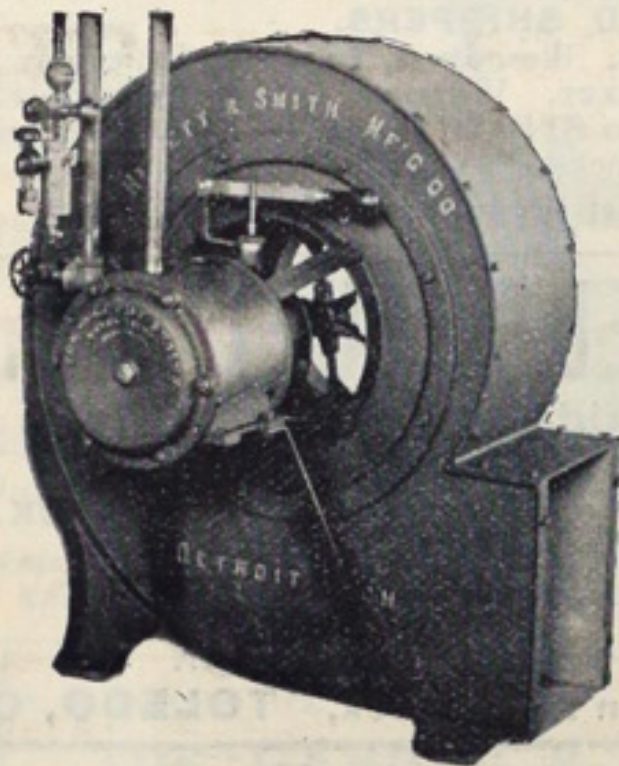
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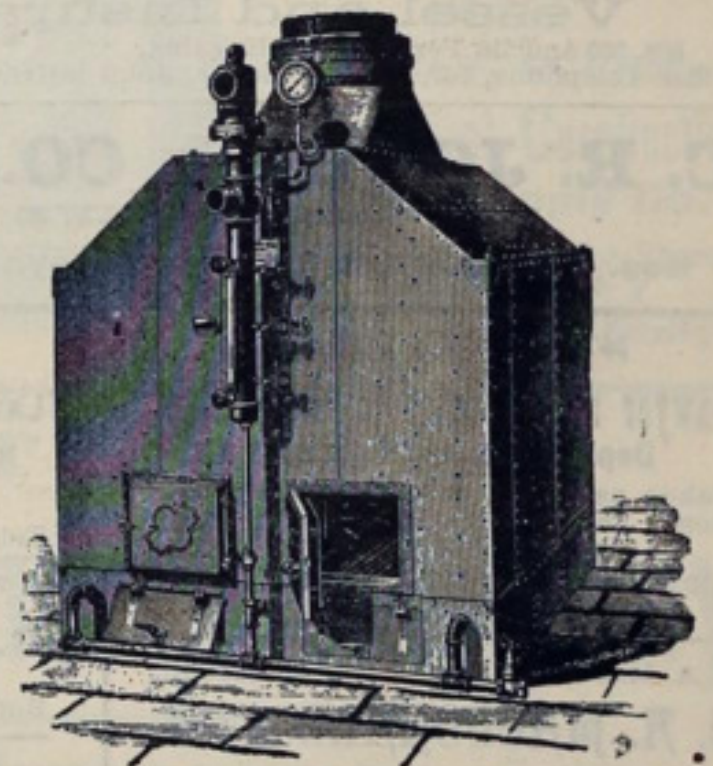
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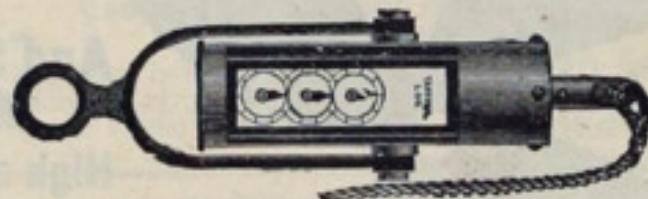
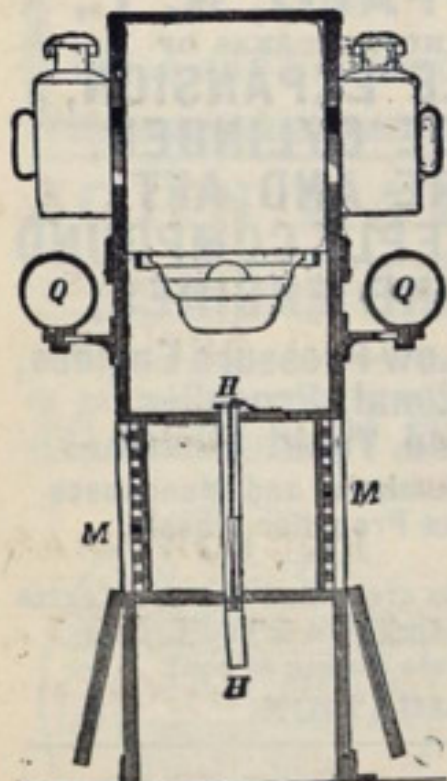
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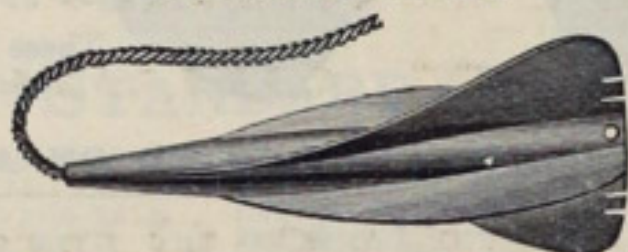
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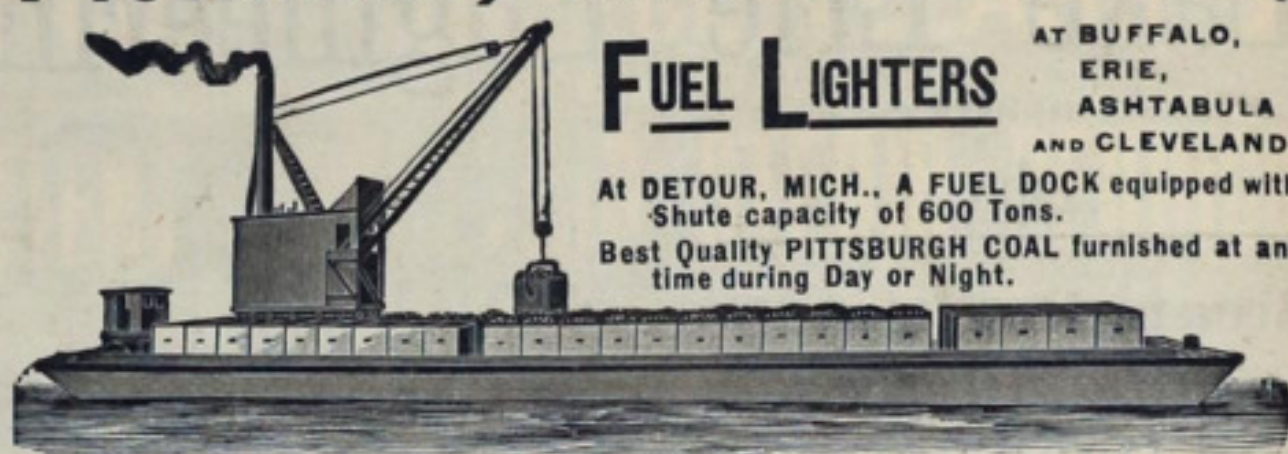


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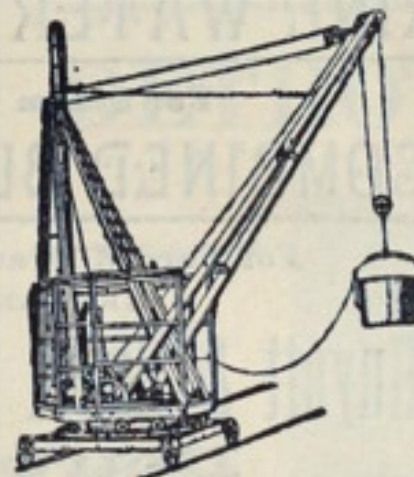
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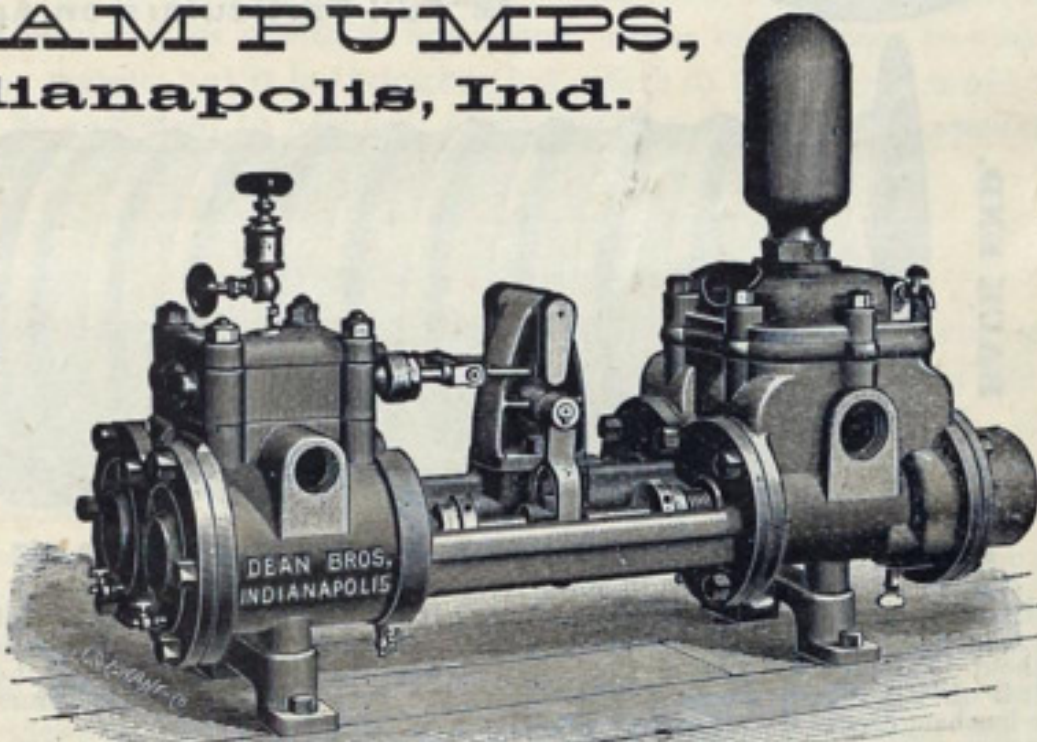
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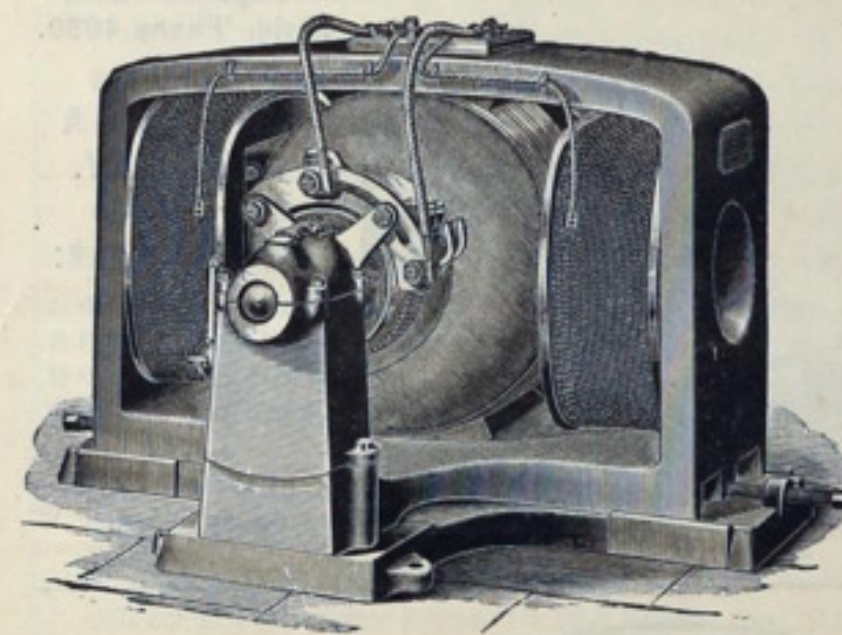
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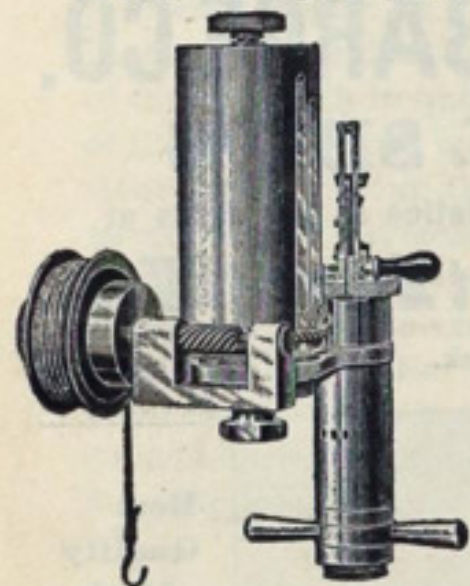
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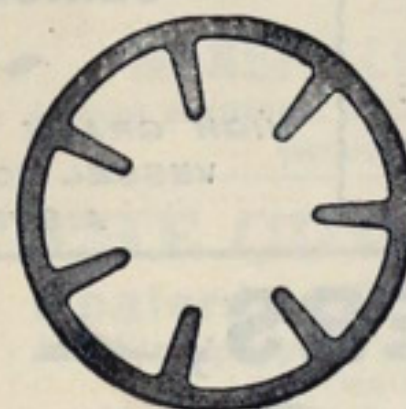
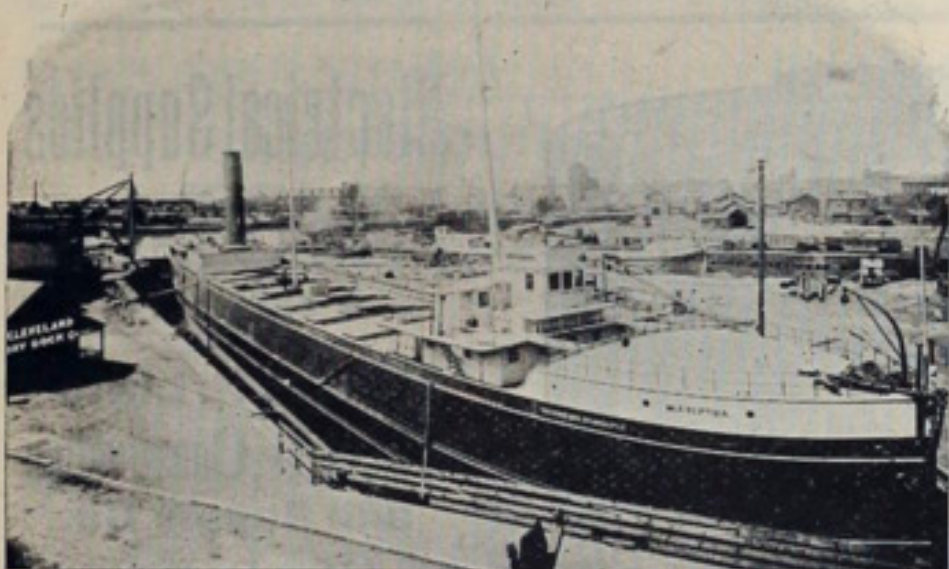
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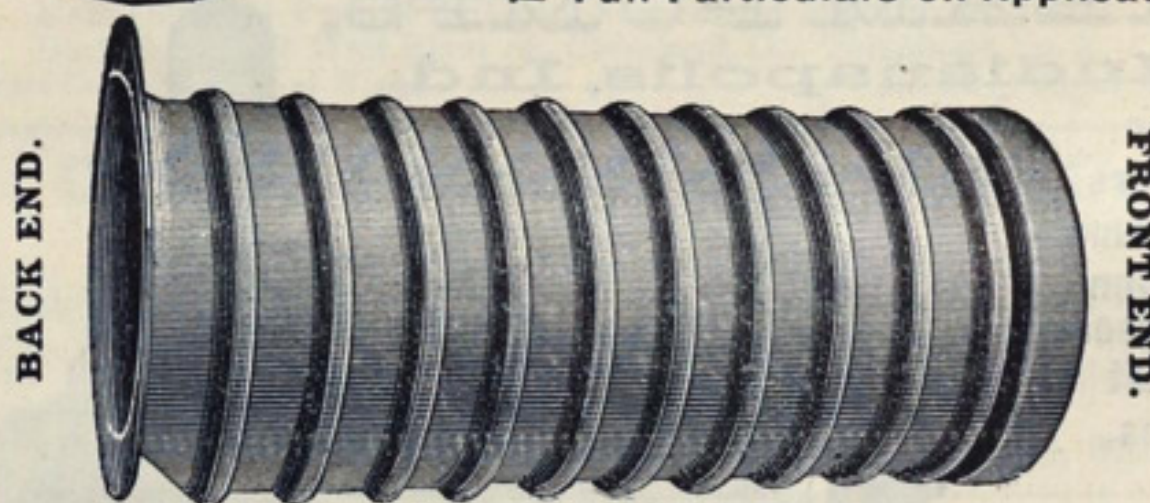
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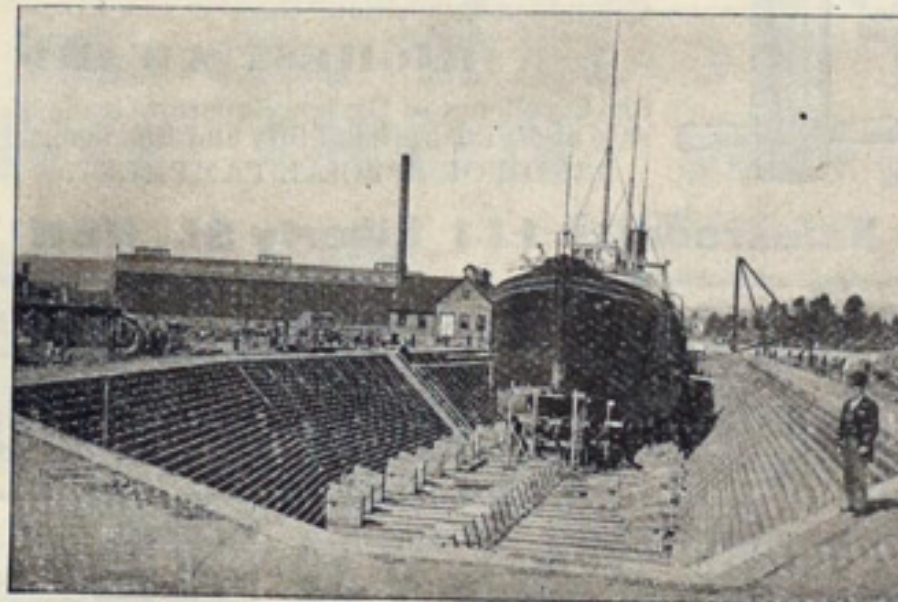
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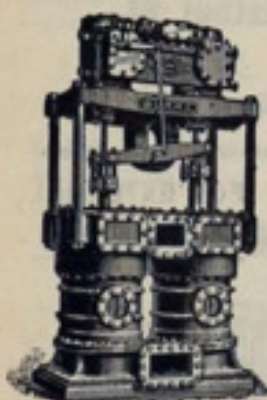
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